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2010

## Stimulating Our Food Environment

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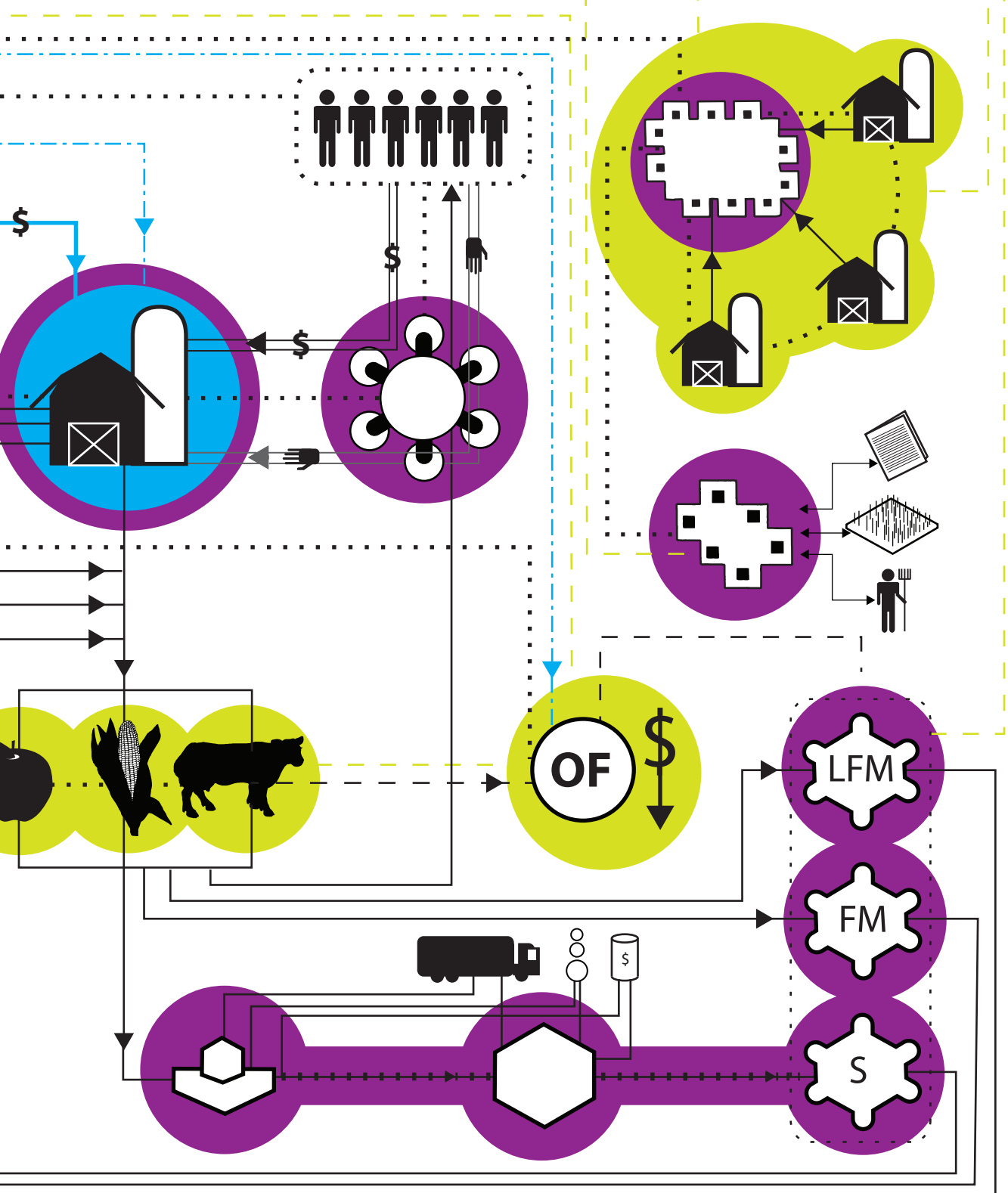
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# contention

“Unless we address the political and socio-economic structures that govern cities, the question of what shape we build them, ecologically speaking, is of marginal importance. It is how cities function as organic entities that really matters.”

Carolyn Steel \_ Hungry City \_ ix

Our current food system is characterized by large monocultures of corn and soy, and cheap calories of fat, sugar, and feedlot meat controlled by a few large corporations due to a specific set of government policies that sponsored a shift from solar and human energy on the farm to fossil-fuel energy. <sup>1</sup> This industrial food system, after transportation, uses more fossil fuel than any other sector of the economy and produces more greenhouse gases than anything else. Cheap processed fast food made possible by subsidies, chemical fertilizers, and pesticides has led to the rise of obesity and chronic diseases such as type two diabetes. With undeniable links to healthcare reform, energy independence, and climate change, radical food system reform is necessary before progress can be made on any of these three issues. **This thesis argues that architecture must be more than just the physical creation of space and become involved in the design of policies and sustainable systems, which support local food systems providing healthy food for all people regardless of income or race, helping to restore the environment rather than destroy it.** “Unless we address the political and socio-economic structures that govern cities, the question of what shape we build them, ecologically speaking, is of marginal importance. It is how cities function as organic entities that really matters.” <sup>2</sup> The re-design of the food system [policies, systems, programs] will inform how our built environment is created, accessed, and understood.

# glossary

**AGRIBUSINESS:** The large private companies that now provide inputs to farmers (seed, chemicals, machinery) and handle farm products on their way to the final consumer (transport, processing, packaging wholesale, and food retail companies).<sup>1</sup>

**ARCHITECT:** A person who is responsible for inventing or realizing a particular idea or project.

**ARCHITECTURE:** The careful structure and design of anything. The effective arrangement and restructuring of the city, a territory, or spaces and the networks that articulate it.

**AGRICULTURE:** The science or practice of farming, including cultivation of the soil for the growing of crops and the rearing of animals to provide food, wool, and other products.

**AGROECOLOGY:** The science of integrating agricultural production in its global, regional and local ecological, cultural and social context. Promoting farming methods that work with nature and are environmentally sustainable.

**CAFO:** (Concentrated animal feeding operation) or factory farm, is large production of raising livestock in close confinement where a farm functions more like a factory which most typically mass-produce meat, eggs, and dairy.

**CASH CROP:** Crops grown to be sold by the farmer rather than grown to be consumed on the farm. Typically refers to corn, soybean, wheat, rice, and cotton.

**CIVIC AGRICULTURE:** Locally based food production that is tightly linked to a community's social and economic development.

**COMMUNITY SUPPORTED AGRICULTURE:** A farming and food distribution model in which a group of individuals or families commit resources (money and/or labor) to a farmer in exchange for produce.

**ENVIRONMENT:** The natural world. The surrounding or conditions in which a person lives or operates.

**GENETICALLY MODIFIED FOOD:** Food that contains ingredients from crop plants developed using the modern science of genetic engineering, also known as transgenic or genetically modified organism (GMO) crop plants.<sup>2</sup>

**FARM SUBSIDIES:** Financial assistance paid to farmers by the government intended to boost the income of farmers in the form of direct cash payments, trade protection from

foreign competitors, market interventions to raise farm commodity prices, or exemptions from some kinds of taxation.<sup>3</sup>

**FOOD:** Any nutritious substance that people or animals eat or drink, or that plants absorb, in order to maintain life and growth.

**FOOD DESERT:** A geographical area or neighborhood with no or distant access to grocery stores and fresh, healthy food.

**LOCAL FOOD:** Food that is grown or raised relatively close to the final consumer.

**MONOCULTURES:** The cultivation of a single crop in a given area.

**NEIGHBORHOOD:** A district, especially one forming a community within a town or city; the people of such a district; the area surrounding a particular place, person, or object.

**ORGANIC:** Produced or involving production without the use of chemical fertilizers, pesticides, or other artificial agents.

**POLYCULTURES:** The simultaneous cultivation or exploitation of several crops or kinds of animals.

**POLICY:** A course of action adopted and pursued by a government or organization.

**PUBLIC:** Concerning the people as a whole; open to or shared by all the people of an area or country; or provided by the government rather than an independent, commercial company.

**RURAL:** In, relating to, or characteristic of the countryside rather than the town.

**STIMULATOR:** Something that instigates change; encourages development or progress.

**SUSTAINABLE AGRICULTURE:** A system of food and fiber that produces food that is safe, wholesome and nutritious and promotes human wellbeing while preserving the natural environment and not shifting environmental burdens onto others in society.

**SYSTEM:** A set of principles or procedures according to which something is done; an organized scheme or method. A series of things which work together to form a complex whole.

**URBAN:** In, relating to, or characteristic of a city or town.

**URBAN AGRICULTURE:** Cultivating, processing and distributing food in cities.

# introduction

“Even if we were willing to continue paying the environmental or public-health price, we’re not going to have the cheap energy (or the water) needed to keep the system going, much less expand production. But as is so often the case, a crisis provides opportunity for reform, and the current food crisis presents opportunities that must be seized.”

Michael Pollen\_Farmer in Chief\_2008

No region in the United State can be considered self-sufficient in food production. Consumers depend heavily on imported products that can only be produced in climates outside of their region and many times outside of the country. In many places there is no food produced locally even though the land surrounding our cities may be capable of producing a wide range of food products. Historically these were areas of production, however, the industrialization of agriculture paired with access to cheap fossil fuels made it possible to produce large quantities of cheap grain, meat, and processed food and move it across the country at little cost. Today many American cities’ foodshed, the flow of food from where it is grown to where it is consumed, spread around the world.<sup>1</sup> The global food system we find ourselves in has been influenced by a number of laws and regulations designed by the federal government. The system largely supports national and multinational corporations, who are responsible for a vast majority of the food produced and consumed in the United States. Our food system relies so heavily on fossil fuel that it is “deeply implicated in everything about the way we currently grow food and feed ourselves.”<sup>2</sup>

The industrial food system is consuming oil, destroying our environment, and making people sick. If we continue down the path of the industrial food system we will find ourselves without fossil fuels, a polluted environment stripped of its nutrients, and a society with more health problems than we have doctors to solve them. Therefore we are faced with a crisis. Without a drastic restructuring and reform of the national food system and without returning the visibility of food to the public realm, solving issues of hunger, obesity, and inner city food deserts won’t be possible.

As Pollen said, we need to seize the opportunity to reform the current food system. We need a food system in which fresh, healthy food is available to all people, regardless of economic class or geographic location. We need a food system that supports healthy lifestyles and healthy environments. One that is sustainable and benefits the environment instead of destroying it. One that is not dependent on oil but rather dependent on the sun and natural resources. We need a food system that reconnects the feeders and the fed.

“The value of architecture no longer results from creating shapes in space, but rather from fostering relationships within it.”<sup>3</sup> With the creation of a sustainable network of policies, programs, and systems we can begin to see what implications and improvements this will have on the built environment. An understanding of the interconnected systems and policies that have shaped our food system is imperative before we can operate within the system to stimulate change.

# history

“Cities, like people, are what we eat.”

Carolyn Steel \_ Hungry City \_ ix

## food and the city

“The activity of buying and selling food has shaped our cities and towns for centuries, since an urban population by nature depends on others for agricultural production.”

Helen Tangires \_ Public Market \_ 9

As a human race we began as hunters and gathers, roaming the world in search of food. When the Ice Age ended it left behind The Fertile Crescent, which was rich with natural foods such as wheat and barley. With the discovery of grain came the ability to store grain in large enough quantities, allowing for permanent settlements to be possible. Thus agriculture gave life to cities. It was a grueling and stressful process, which required precise timing and skill. “Nobody in the ancient world ever took their food for granted.” <sup>1</sup> Celebrations in the ancient city were mirrored on the agricultural calendar. Expansion of the ancient civilizations of the Greeks and Romans was based on the natural features of the site and when a new city was chosen a pit was dug into which a sacrifice to the gods of the underworld was thrown. Likewise later in the Roman Empire, Rome expanded and used trade routes to supply the city with food from all over the Mediterranean from Egypt to England. The cultivated land surrounding the Roman cities was considered an extension of the city and was owned by urban elites because it had to be protected. Roman villas were not just pleasant retreats but many were also farms using slave labor to produce fruit, vegetables, poultry, fish, and snails for the urban market. Dionysius of Halicarnassus visited Rome and described the relation of the country to the city as “so closely is the city connected with the country, giving the beholder the impression of a city stretching out indefinitely.” <sup>2</sup>





*The Effects of Good Government on City and Country.* Ambrogio Lorenzetti. 1338.<sup>1</sup>



*The Allegory and Effects of Bad Government.* Ambrogio Lorenzetti. 1338.<sup>2</sup>

After the fall of the Roman Empire the Barbarians took control over the country, restoring hunting cultures. But by the ninth century agricultural clearings were taking over the forests and disputes over territory were common as groups sought to secure rights to the land. In the early Middle Ages monasteries became the models for new cities and in the 11th century fortified communes were located across Europe. In the medieval city, unlike the ancient cities, the cultivated land surrounding the city was managed by city councilors. There was a close relationship between the city and the country. In the council chamber room of the commune of Siena in Italy Ambrogio Lorenzetti depicted this relationship in a series of frescos. The window of the chamber room frames the countryside and to the left of the window is the fresco titled *The Effects of Good Government on City and Country* and on the opposite wall is the fresco titled *The Allegory and Effects of Bad Government*. In the 'Good Government' fresco Lorenzetti depicts Siena and the countryside, both well-maintained and orderly, living peacefully. There are peasants tilling the fields and farmers entering the city with crops and livestock to take to the market. However in the 'Bad Government' fresco Siena is distressed. War is raging in the countryside and the fields are burned and barren. In the city, buildings are crumbling, windows are broken, and theft and robbery are taking place. The frescos clearly articulate the relationship of the city and its countryside. "Look after your countryside, and it will look after you."<sup>3</sup>

In the pre-industrial city wealthy city-dwellers all over Europe had country estates, which supplied them with grain, poultry, and vegetables. Even the bourgeoisie and merchant class had small country homes for farming production to imitate the rich. Residents of the pre-industrial city also brought the country to the city. It was not uncommon for city homes to have pigs and chickens and grain and hay stored in the yards. Urban farming continued in cities into the nineteenth century. But with the rise of industrial farming, new technologies and farm machinery meant farms had higher production numbers with fewer workers employed. Many farm workers lost their jobs and flocked to the city to find work, eliminating many of the social connections between the rural communities and the urban communities. Furthermore the invention of the railway completely disconnected the city from the country. The railway allowed cities to get food from almost anywhere. Food processing prospered in America and for the first time cities had a cheap, reliable source of food. However this was the beginning of factory farms and the denaturing of farming which completely severed the tie between the feeders and the fed.

# RULES

## REGULATING THE MARKET!

Provost Marshal's Office,  
Beaufort, N.C., July 28, 1864.

All fresh provisions will be sold on Market Wharf. Market boats are not permitted to land at any other wharf, and persons arriving in said boats will report in person at this office. The intention is to accommodate ALL PERSONS, and to this end sales will be limited. No special permits will be given to any officer, soldier, or citizen, to purchase extra supplies, and sales at the wharf for purpose of speculation are forbidden. The limitation of purchases will be regulated by the Guard, under special orders from this office.

The following are the MAXIMUM prices to be asked for the articles enumerated below, and the Guard will arrest any person violating, or attempting to violate, these regulations :

| MEATS.   |                          | VEGETABLES.       |                    |
|--|--------------------------|-------------------|--------------------|
| Fresh Beef,  | per lb., 80 18           | Potatoes, (sweet) | per bushel, 1 00   |
| " Pork,  | " 16                     | " (Irish)         | " 1 50             |
| " Mutton,  | " 18                     | Beans (string)    | per peck, 30       |
| " Veal,  | " 18                     | Tomatoes,         | " 25               |
| Ham,   | " 30                     | Peas,             | " 40               |
| Venison,   | " 25                     | Beets,            | " 25               |
| POULTRY, &c.   |                          | Turnips,          | " 25               |
| Turkeys,   | each 1 25                | Onions,           | " 30               |
| Geese,   | " 1 00                   | Corn,             | per dozen ears, 25 |
| Ducks, (tame)  | " 50                     | Cucumbers,        | per dozen, 20      |
| " (Canvass back)   | " 50                     | Cabbage,          | head, 10           |
| " Other varieties,   | per pair, 1 00           | FRUITS.           |                    |
| Chickens, (large)  | " 90                     | Peaches,          | per peck, 1 00     |
| " (middling)   | " 60                     | Pears,            | " 75               |
| Pigeons,   | per dozen, 1 00          | Apples,           | " 50               |
| Quails, (or Partridges)                                    | " 1 00                   | Plums,            | per quart, 10      |
| Eggs,  | " 20                     | Currants,         | " 20               |
| FISH.  |                          | Grapes,           | per peck, 50       |
| Shad,  | per lb., 10              | Berries,          | per quart, 15      |
| Other fish, from 5c. to 7c. per lb., according to quality, |                          | Watermelons,      | each, 30           |
| Salt Fish,   | per lb., 08              | Muskmelons,       | " 20               |
| Oysters, (large)   | per gallon or bushel, 60 | MISCELLANEOUS.    |                    |
| " (middling)   | " 45                     | Honey,            | per lb., 25        |
| Clams,   | " 50                     | Beeswax,          | " 60               |
| Crabs, (soft)  | per dozen, 40            | Otter Skins,      | 2 00 to 4 00       |
| " (stone)  | " 85                     |                   |                    |
| Terrapins,   | each, 15                 |                   |                    |

WALTER S. POOR,  
Lt. Col. & Provost Marshal,  
Beaufort, N.C.

### public market

"For all their mess, noise and nuisance, markets bring something vital to a city: an awareness of what it takes to sustain life."

Carolyn Steel \_ Hungry City \_ 133

The role of the public market in the city was crucial in the way it contributed to the social and political lives of all city dwellers. Markets first appeared as "specifically appointed places of exchange" where people gathered for mutual benefit. <sup>4</sup> Markets can be understood in the way that Foucault discusses heterotopias, "places that embrace every aspect of human existence simultaneously, that are capable of juxtaposing in a single space several aspects of life that are in themselves incompatible" <sup>5</sup>

In antiquity the official marketplace was located in the civic center and served as the site not only for trade and commerce but also for administrative, legislative, judicial, social, and religious activities. The central location was convenient for city dwellers as well as vendors bringing their goods by road or water. In many cases markets fostered the development of entire commercial districts. <sup>6</sup> It was around the buying and selling of food that people met to socialize. The marketplace was governed by a series of "market laws" to protect both the consumer and the vendor. Market laws regulated forestalling, the buying or selling of goods before they got to the marketplace and regrating, the buying of goods for resale within the market. Other laws protected the consumers from fake vendors, profiteering, fraud, and cheating.

Market typologies have developed throughout history in order to provide an ordered trading environment and protection from the elements.





OPEN-AIR MARKETPLACE



STREET MARKETS



STREET VENDORS



MARKETS IN PUBLIC BUILDINGS



MARKET SHEDS



ENCLOSED MARKET HOUSE

clockwise from top left: Biskra, Algeria 1899 \_ Paris, France 1920 \_ Ross-on-Wye, England 1890-1910 \_ Ciry Market, Indianapolis, Indiana 1970 \_ Mercato Nuovo, Florence, Italy, 1890-1910 \_ New York, New York 1980.<sup>4-9</sup>

The *open-air marketplace* is the most universal market typology. These typically take advantage of already publicly owned property with good access to transportation routes. The open-air market is seen in many variations around the world. Islamic cities call the open air market the souk or bazaar and typically have a site with a mosque and an open space for the sale of fresh produce as well as streets lined with warehouses and shops selling goods.<sup>7</sup>

*Street markets* are similar to the open-air marketplace except have a linear expansion. These elongated marketplaces usually are located on publicly owned land and are easy to expand because they are not constrained by permanent structures. The street market typology established a direct marketing between producer and consumer. The street markets developed into curb markets and pushcart markets in the United States.<sup>8</sup>

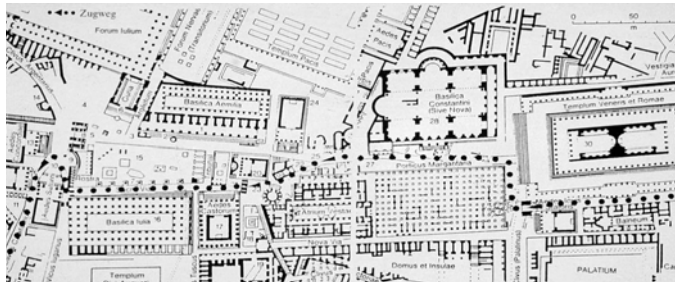
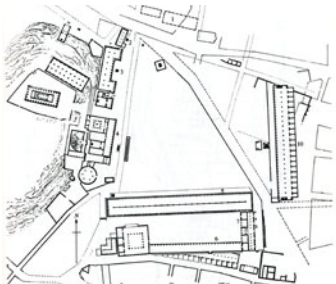
*Street vendors* have developed structures that allow them mobility. Street vendors have provided produce to people who may not be able to travel to the market. The necessity to move with goods has led to the careful construction of vendor carts, which protect their goods from the elements while marketing their goods at the same time.<sup>9</sup>

*Markets in public buildings* is a form typically characterized by a single building with a government hall above and open arcade on the ground floor where the market took place. This typology exploits the relationship between local government and the commercial activity of the market and how the two support each other.<sup>10</sup>

*Market sheds* is the most common type of covered market and is usually rectilinear and supported by piers, posts, or columns, which allows for it to be open on one or more sides. The shed typology provides minimal protection from the elements while being easy to construct and the open sides allow for easy access.<sup>11</sup>

The *enclosed market house* typology arose in the late 1800s as cities replaced their open market sheds with fully enclosed market buildings. Cast iron developments allowed the structures to be large covered spaces with an open plan free of supports. The advantage to the enclosed market was that it allowed year-round sales and more permanent stalls inside.<sup>12</sup>

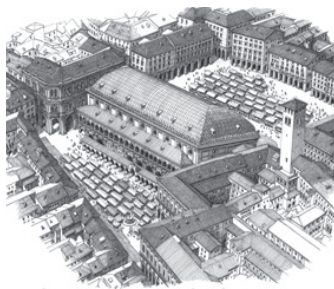
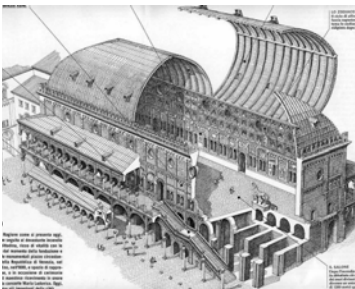




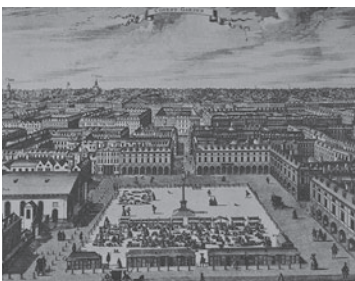
ATHENIAN AGORA \_ ATHENS, GREECE<sup>10</sup> + ROMAN FORM \_ ROME, ITALY<sup>11</sup>



LES HALLES MARKET \_ PARIS, FRANCE<sup>12-14</sup>



PALAZZO DELLA RAGIONE \_ PADUA, ITALY<sup>15-17</sup>



COVENT GARDEN PIAZZA \_ LONDON, ENGLAND<sup>18-20</sup>

Tracing the buying and selling of food in the marketplace illustrates the shift from public to private that has occurred over history. With that shift we lost a very important part of the buying and selling of food, the interaction between people, space, and food in the public realm.

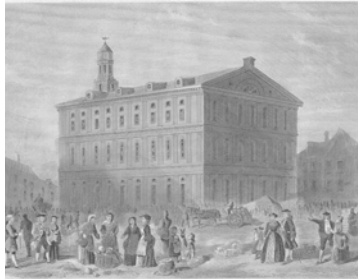
The *Athenian Agora* and the *Roman Forum*, the two most famous public spaces, were both originally food markets. But as the cities grew they moved from commercial space to political space. It was in these spaces where the public life of the city took place resulting in a mix of food, politics, and philosophy. The role of the public market in the city is one that can be traced throughout history as being central to public and political life in the city.<sup>13</sup>

In Paris, *Les Halles Market* was the food hub of the city. In 1180 the food hub was like a city within a city with different sections selling different types of produce. In the mid 1800's a glass structure was built to house the market. By 1870 the market covered 20 acres and half was covered by 10 iron and glass pavilions. The market had two underground levels, one for food storage and one for connection to the railway stations. Les Halles Market remained the central food hub of the city until it was demolished in 1971 to make an underground shopping mall.<sup>14</sup>

*Palazzo Della Ragione* in Padua, Italy is a thirteenth century example of the relationship of food and politics, which remains today. Here the Palazzo houses the council chamber on the upper floors and on the ground floor is an arcade of shops. Hall and market represent the perfect reflection of urban hierarchy where politics is supported by commerce and there is a mutual dependence on one another.<sup>15</sup>

The *Covent Garden Piazza* in London was the first public space in London. Designed by Indigo Jones in 1632 it was built to house noble residents of the city. But when the Duke left for war the open space of the piazza was taken over by the public as a market. In the 1830s market buildings were erected in the center of the piazza to house the market. The market was a busy and lively part of the city through the middle of the twentieth century until the market buildings failed to contain the market and traffic congestion became a problem. The market was then relocated three miles away and the market building was transformed into a shopping center.<sup>16</sup>





FANEUIL HALL MARKETPLACE \_ BOSTON, MA<sup>21-23</sup>



PIGGLY WIGGLY \_ MEMPHIS, TN<sup>24-26</sup>



MCDONALDS BBQ \_ SAN BERNADIO, CALIFORNIA<sup>27-29</sup>



SOUTHDAL SHOPPING CENTER \_ EDINA, MN<sup>30-32</sup>

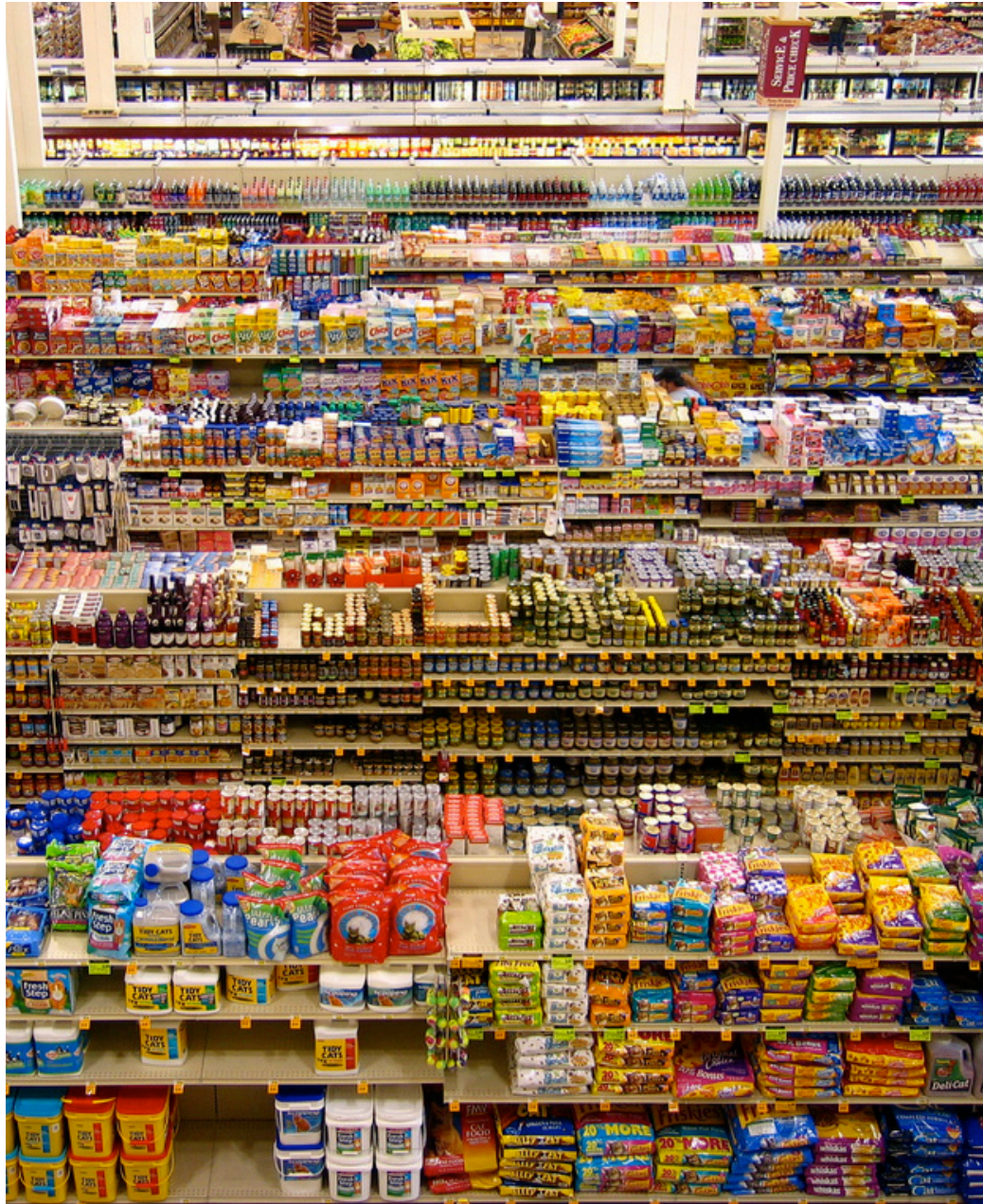
*Faneuil Hall Marketplace* in Boston, MA was built in the 1740s in the English country style with an open ground floor market and an assembly room above. It remained a marketplace until the 1960s when it was scheduled to be torn down but instead was transformed into a 'festival marketplace'. It was used to foster urban renewal. Faneuil Hall went from a retail trade market to a wholesale marketplace.<sup>17</sup>

The *Piggly Wiggly*, the first supermarket, was invented by Clarence Saunders in 1916 in Memphis, Tennessee because he thought that by taking the sociability out of food shopping he could save time and therefore lower the price. With the invention of the supermarket the concept of the public market as the union of food and social and political life is lost. Because Supermarkets have control over the food market they have control over us because the control of food gives control to people and space.<sup>18</sup>

In the 1940s the concept of speed and convenience was pushed even further by Ray Kroc and the McDonald brothers. *McDonald's BBQ* restaurant in San Bernadino, California was run by Dick and Mac McDonald. Their restaurant, a typical drive-in restaurant featuring carhop service, was visited by Ray Kroc. Impressed by the effectiveness of their operation he pitched an idea to the brothers to create McDonald's restaurants all over the U.S. In 1955 Ray founded the McDonald's Corporation and the idea of the factory system was brought to the restaurant so that they could have control over the product regardless of the restaurants location. This created the concept of fast food that was inexpensive. Today McDonald's is the largest purchaser of ground beef, potatoes, pork, chicken, tomatoes, lettuce, and apples in the U.S.<sup>19</sup>

The first enclosed shopping mall, the *Southdale Shopping Center*, designed by Victor Gruen, was opened in 1956 in Minnesota. He took the idea of the European high street and put it indoors. The mall contained all sorts of retail stores and boutiques and even had grocery stores. In the next few years shopping malls showed up outside cities across America. The shopping malls sucked the commercial life out of city centers. Gruen viewed the malls as new cities in which urban life could happen inside the mall. The supermarket and shopping mall replaced the public market and therefore marked the death of arguably the most important public space in the city. Because the supermarket and shopping malls are privately owned they are not truly public.<sup>20</sup>





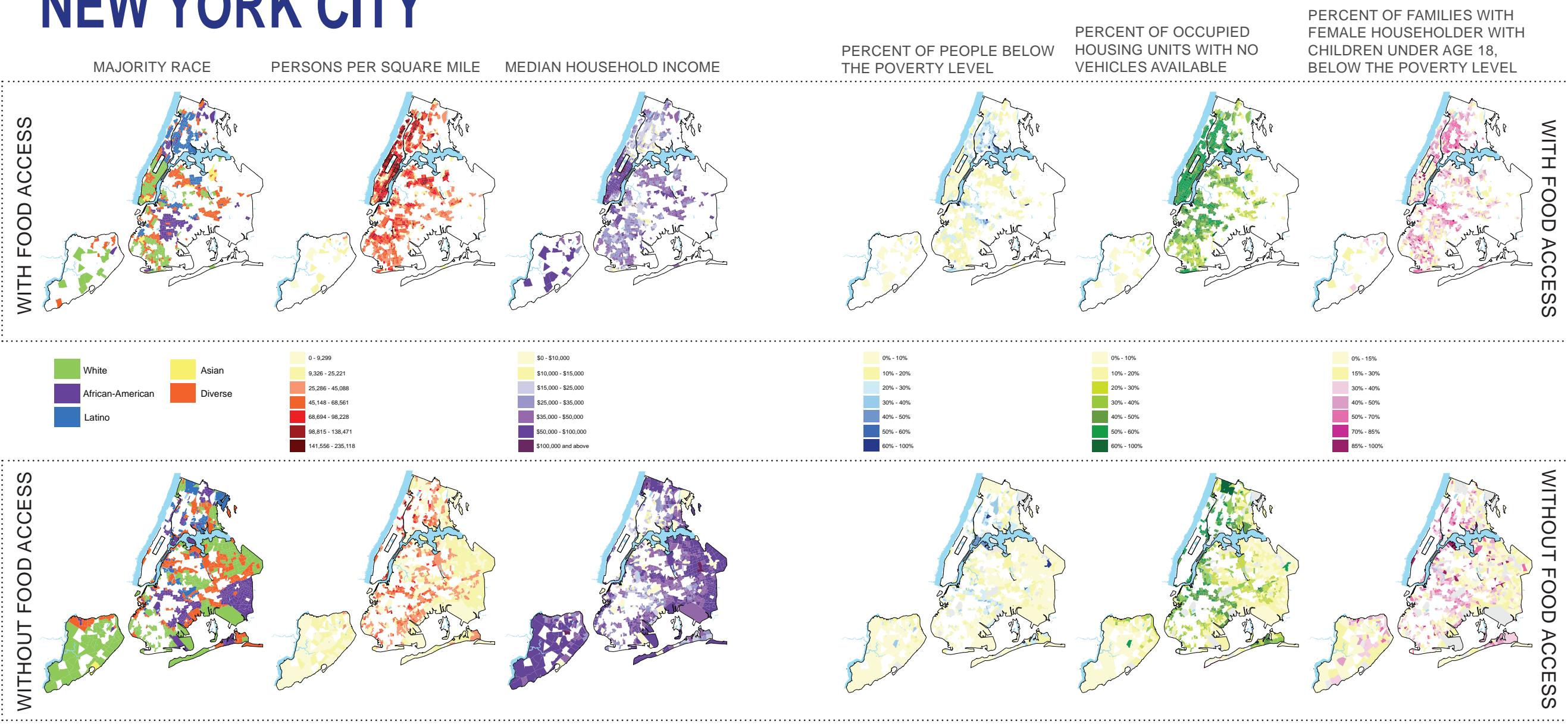
Today most of the food we eat is produced and distributed by large corporations who ship food all over the world before it ends up on a supermarket shelf. The supermarket replaced the messy, negotiated public space of the market with a controlled, security-sensitive private space.<sup>21</sup> There was a level of transparency involved in the marketplace that is lost in the supermarket. Food moved from the public space of the market to a private space of the supermarket. “Supermarkets enjoy the same monopoly over food that markets once did but unlike markets, they have no civic role to play. They are businesses with one goal, making money.”<sup>22</sup>

With the rise of the suburbs large supermarkets fled the inner city for large plots of land in suburbia leaving behind neighborhoods void of fresh food outlets. Unhealthy food outlets such as fast food restaurants and corner stores have taken their place. Leaving many inner-city residents in what is called a food desert, a geographical area or neighborhood with no, or little, access to fresh and healthy food. Many of these residents are without access to a car to drive to the suburbs and have limited budgets. When forced to choose between cheap fast food that is accessible or expensive healthy food that is inaccessible it’s no surprise that people living in food desert neighborhoods resort to unhealthy food to feed their families.<sup>23</sup>

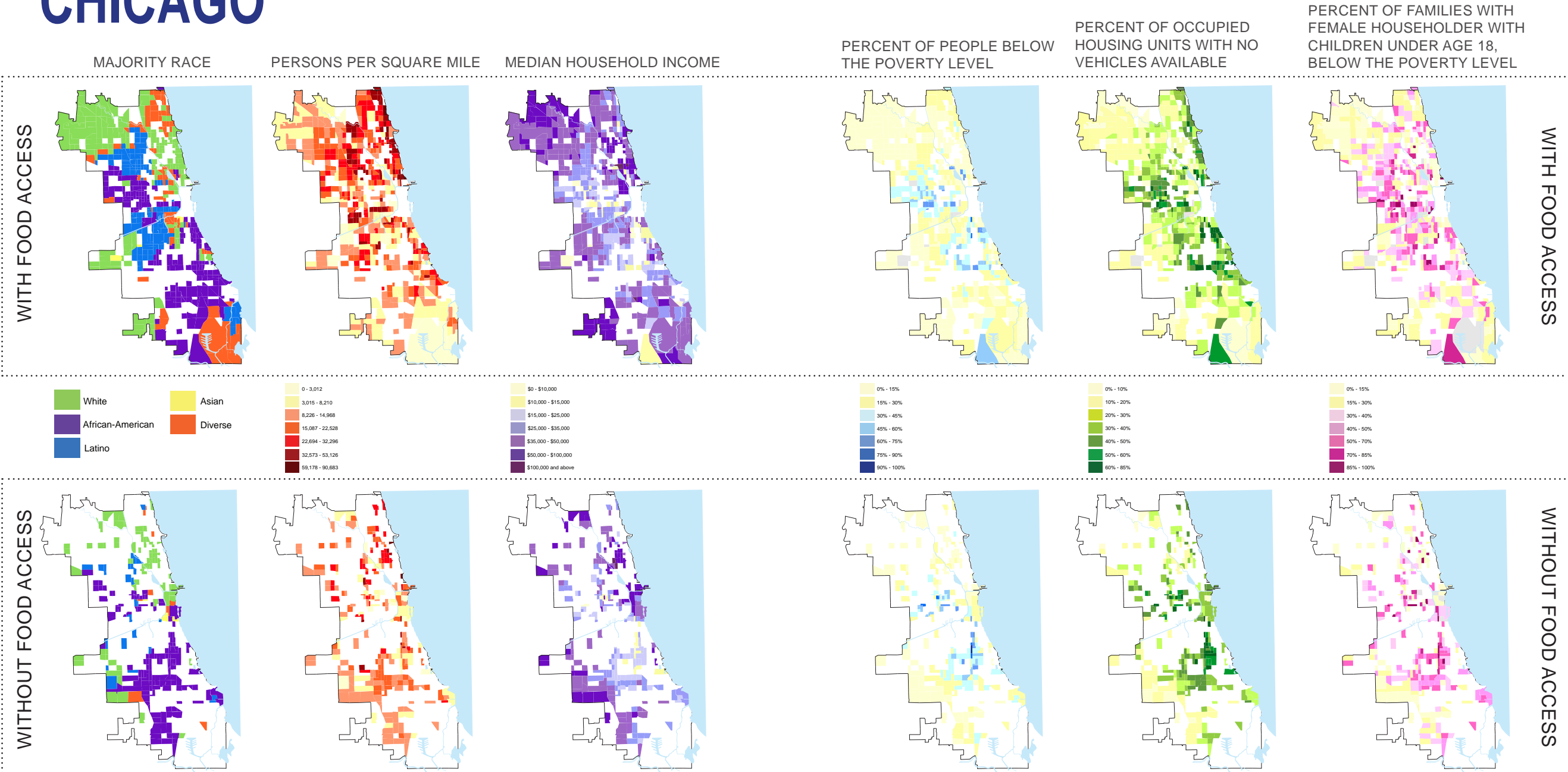
The following pages analyze food deserts in a series of American cities, by comparing census tracts with access to food (fresh food or supermarkets) against census tracts without access to food (limited or no fresh food or supermarkets and a high number of fast food outlets). The cities cover a broad range of sizes and densities and serve as a way to investigate the characteristics of food deserts across America. The cities are: New York City, New York; Chicago, Illinois; Philadelphia, Pennsylvania; New Orleans, Louisiana; Detroit, Michigan; Seattle Washington; and Hartford, Connecticut. Each city is analyzed along the following categories: median household income, percent of people below the poverty level, persons per square mile, percent of families with female householder with no husband present and children under the age of 18 below the poverty level, percent of occupied housing units with no vehicles available, and diabetes rate. These map serve as a foundation to understanding how to operate within a specific city or neighborhood. However, before change can happen on the scale of the city, the food system as a whole needs to be restructured.



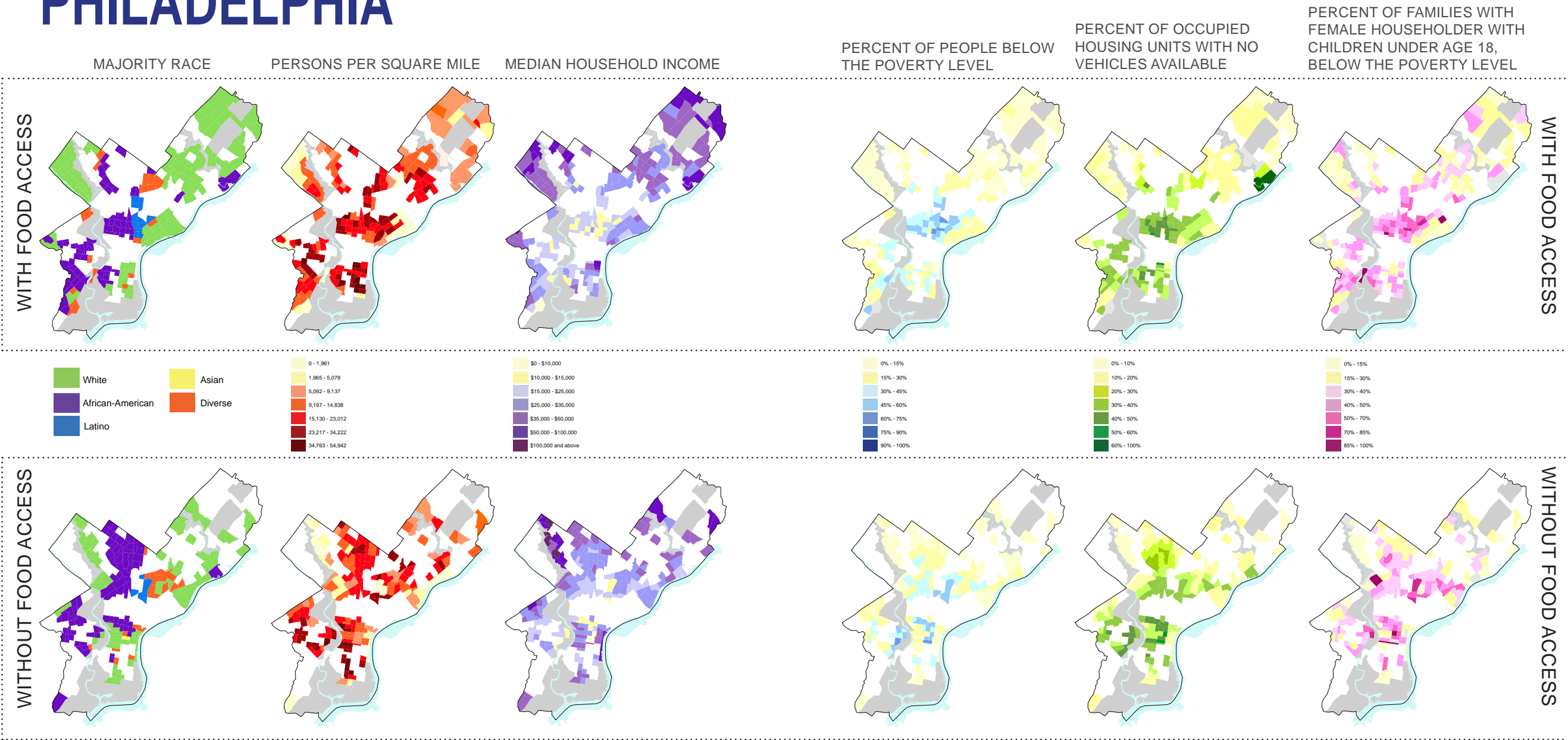
# NEW YORK CITY



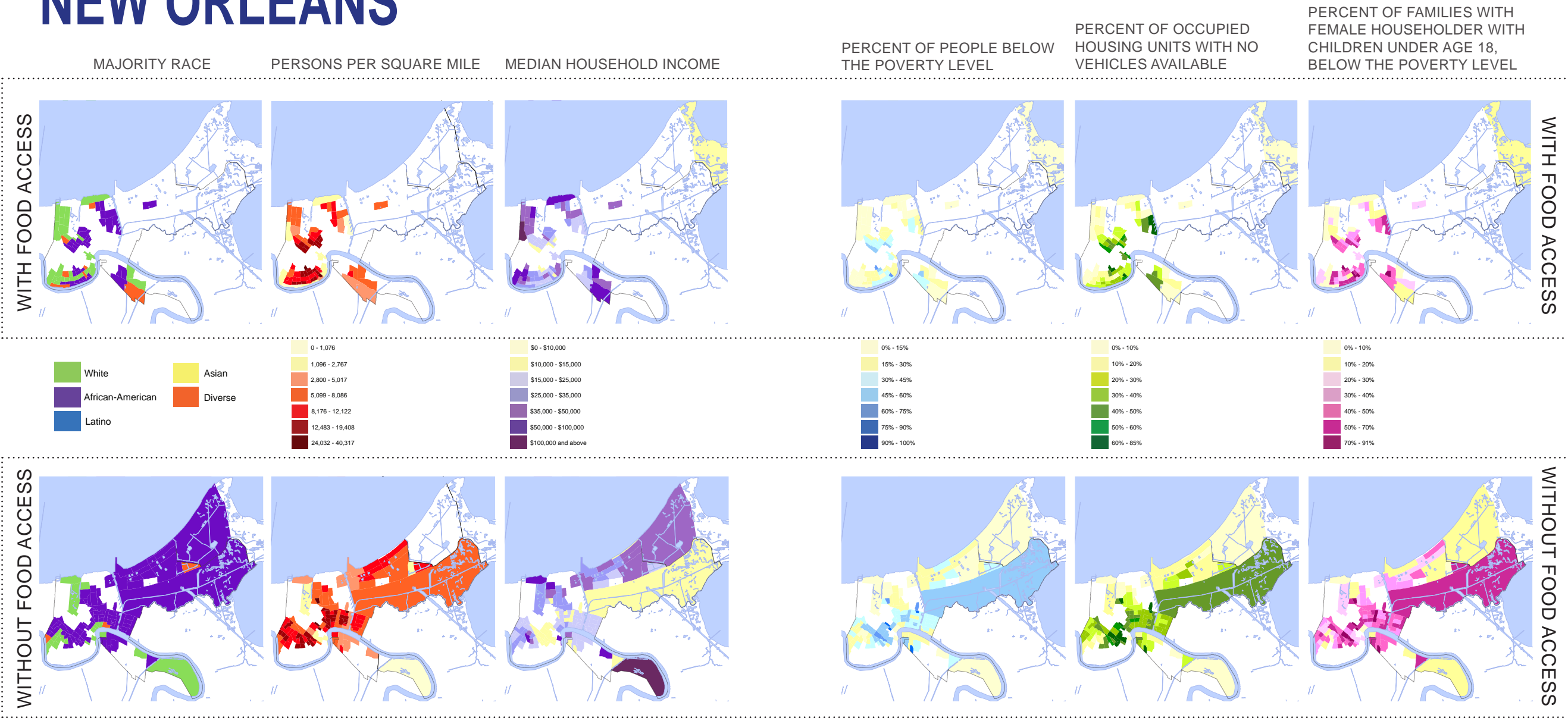
# CHICAGO



# PHILADELPHIA

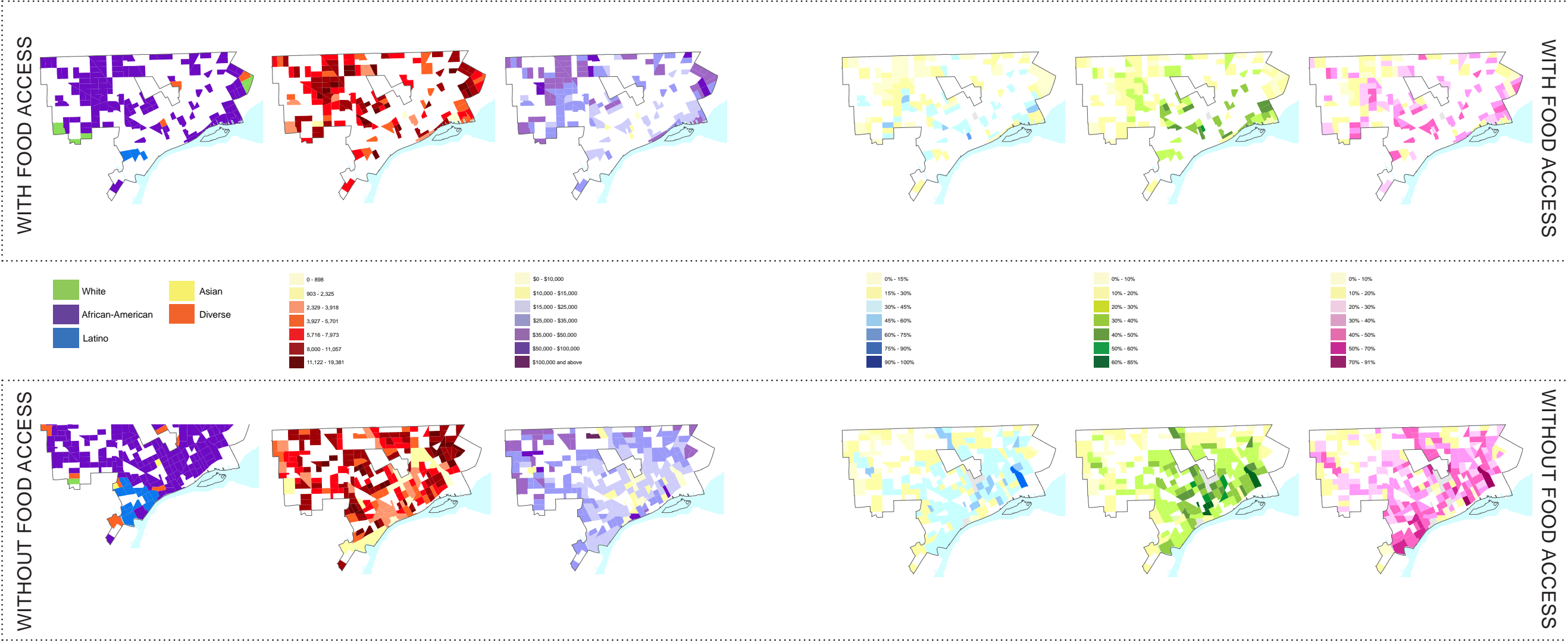


# NEW ORLEANS

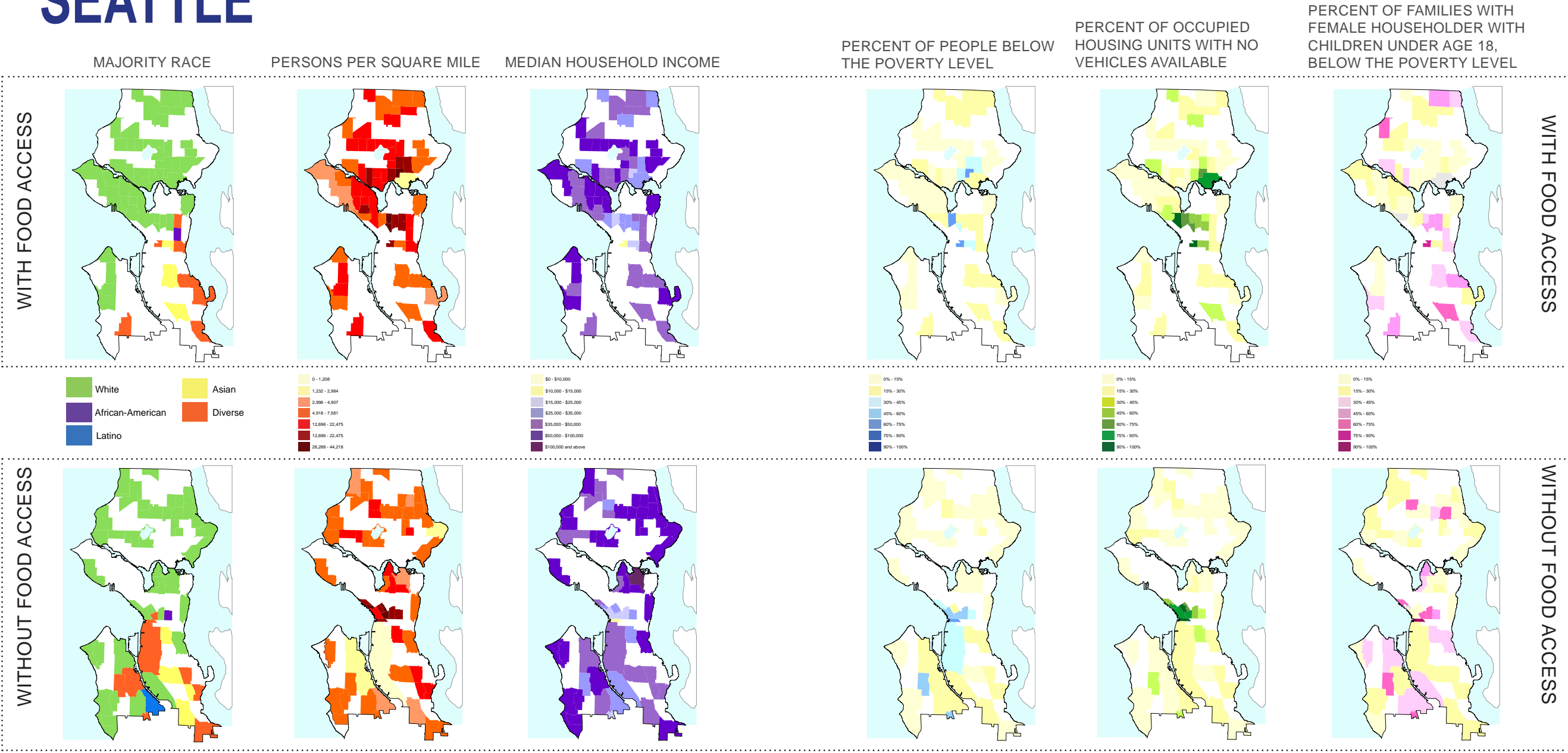




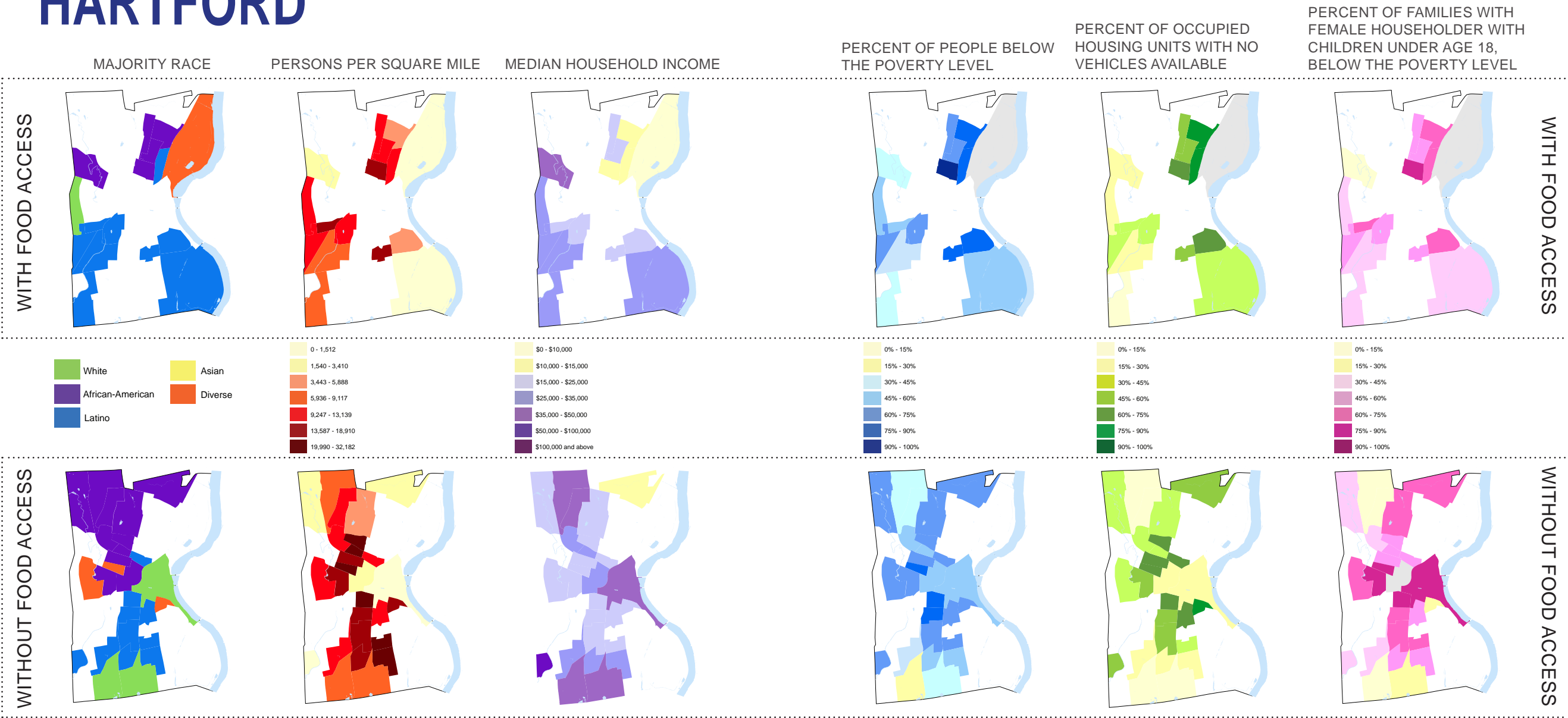
# DETROIT



# SEATTLE



# HARTFORD





## american agriculture

“With the rise of industrial agriculture, vast monocultures of a tiny group of plants, most of them cereal grains, have replaced the diversified farms that used to feed us.”

Michael Pollen \_ In Defense of Food \_ 116

Agriculture in the United States during the nineteenth century was family farm based; most rural families sustained themselves by farming. While some of the family's products would be sold for money on the open market, most was kept solely for the family's consumption or for trade with neighbors or community members for goods and services. Local communities served as trade and service centers for the farming population. Manufacturing and agricultural production were organized along similar social lines and the labor in both sectors was undifferentiated. Manufacturing and agriculture enterprises produced a wide range of goods for local markets, resulting in a geographic landscape in rural America of different clusters of economic activities that met the local communities needs. The local scale was much more dominate than the regional or national markets during the early nineteenth century.<sup>24</sup>

The rise of mass-production techniques in the mid 1800s led to a departure from the system of craft production and gave rise to large-scale ensembles of production. “By World War I... industry after industry had come under the domination of giant firms using specialized equipment to turn out previously unimaginable numbers of standardized goods, at prices that local producers could not meet.”<sup>25</sup> The best example of the transformation to mass-production techniques is the Ford Motor Company's model T assembly line.<sup>26</sup>



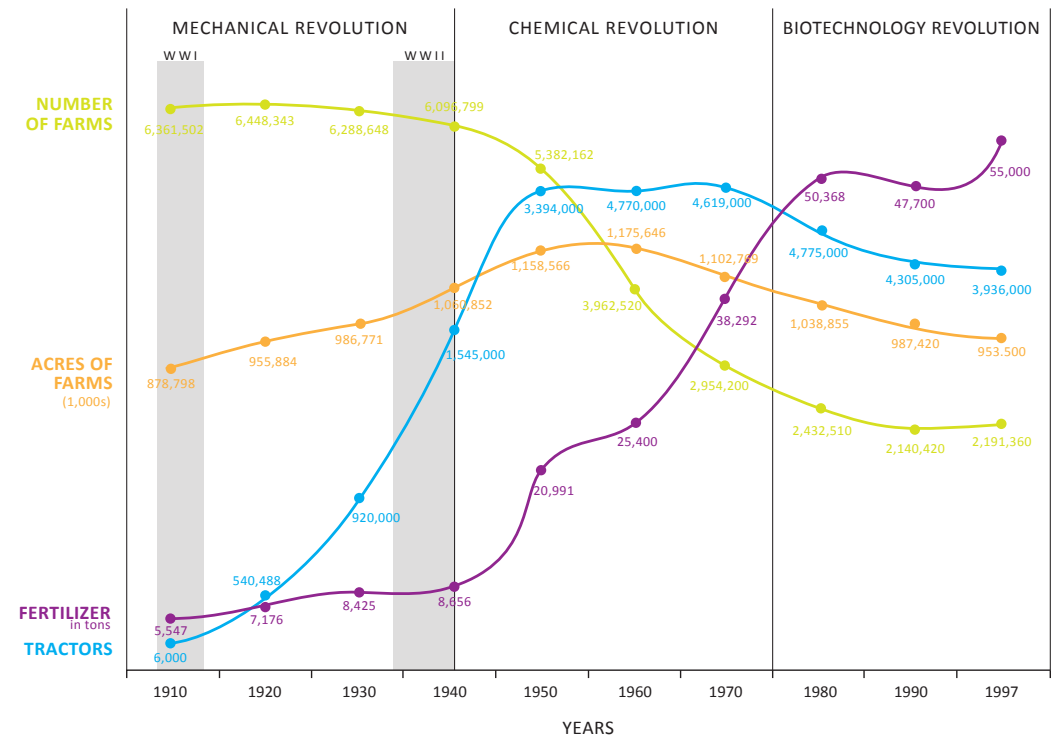




Agriculture production followed the mass-production movement in manufacturing. In 1862 the Morrill Act established the land-grant system of colleges and universities that has become the model of modern agriculture throughout the world. This introduced scientific principles and applied science to agriculture. In 1887 the Hatch Act was passed which created an agricultural experiment station, in each state with the mission to support research in agricultural sciences in an attempt to bring agriculture production up to speed with mass-production manufacturing. And in 1914 the Smith-Lever Act established a mechanism to fund a nationally organized system of outreach to share knowledge and techniques developed at the land-grant universities.<sup>27</sup>

In order to meet the demand of the expanding mass market for agricultural commodities the land-grant system devised new production techniques, new equipment, and new crop varieties. Those at the land-grant universities found they needed to decontextualize the farm enterprise from the community and household settings and instead build a model of agriculture that was based on individual decision making related to the four economic factors of production: land, labor, capital, and management/ entrepreneurship. The new model of agriculture was designed essentially to increase production on less land using less labor through the use of machinery, chemicals, and other purchased inputs and management inputs.<sup>28</sup> This marked the start of the industrialization of American agriculture.

AMERICAN FARMING REVOLUTIONS



The industrialization of American agriculture can be broken down into three major technological revolutions: the mechanical revolution, the chemical revolution, and the biotechnology revolution. <sup>29</sup> The mechanical revolution is marked by the use of tractors and farm machinery leading to a decreased number of workers but an increased amount of land. From 1910 to 1940 there was a decrease in workers by 26.8% but an increase in land by 21.8%. <sup>30</sup> The chemical revolution gave rise to the use of pesticides in post World War II America. Between 1945 and 1980 the use of synthetic fertilizers increased by 715% resulting in an increase of crop yields by 75.4% but a loss of 175,000,000 acres of farmland. The biotechnology revolution began in the 1980's and is the increased used of genetic engineering and recombinant DNA technology. These biotechnologies have resulted in an increased output of both plant and animal agriculture. These processes have all led to the increase of food production with less land and labor, which has become the “American way of farming.”<sup>31</sup>

These three major revolutions were heavily supported by the federal government and were outcomes of specific policies set in place which will be discussed in the coming chapter. But it should be noted that before the federal government was promoting machinery, chemicals, and biotechnology there was a period of time during the two World Wars in which food security in America was scarce. To reduce the pressure on the public food supply brought on by war the U.S. government promoted planting “Victory Gardens”. Victory Gardens or war gardens, were vegetable, fruit, and herb gardens planted at private homes and public parks. They were not only used to help with the public food supply but also helped boost morale. By the end of the second World War 20 million home gardens were producing 40% of the produce consumed in America. <sup>32</sup> However once the war ended and the government dropped the victory garden campaign in support for industrial farming techniques.

Agriculture in the United States has had a strictly economic view of production, forcing agriculture to be removed from the community and household framework and focused on a market-driven system. In the last hundred years the range of agricultural commodities has been narrowed to mostly bulk commodities (wheat, corn, soybeans, a few varieties of fruits and vegetables, and genetically similar breeds of livestock and poultry). <sup>33</sup>



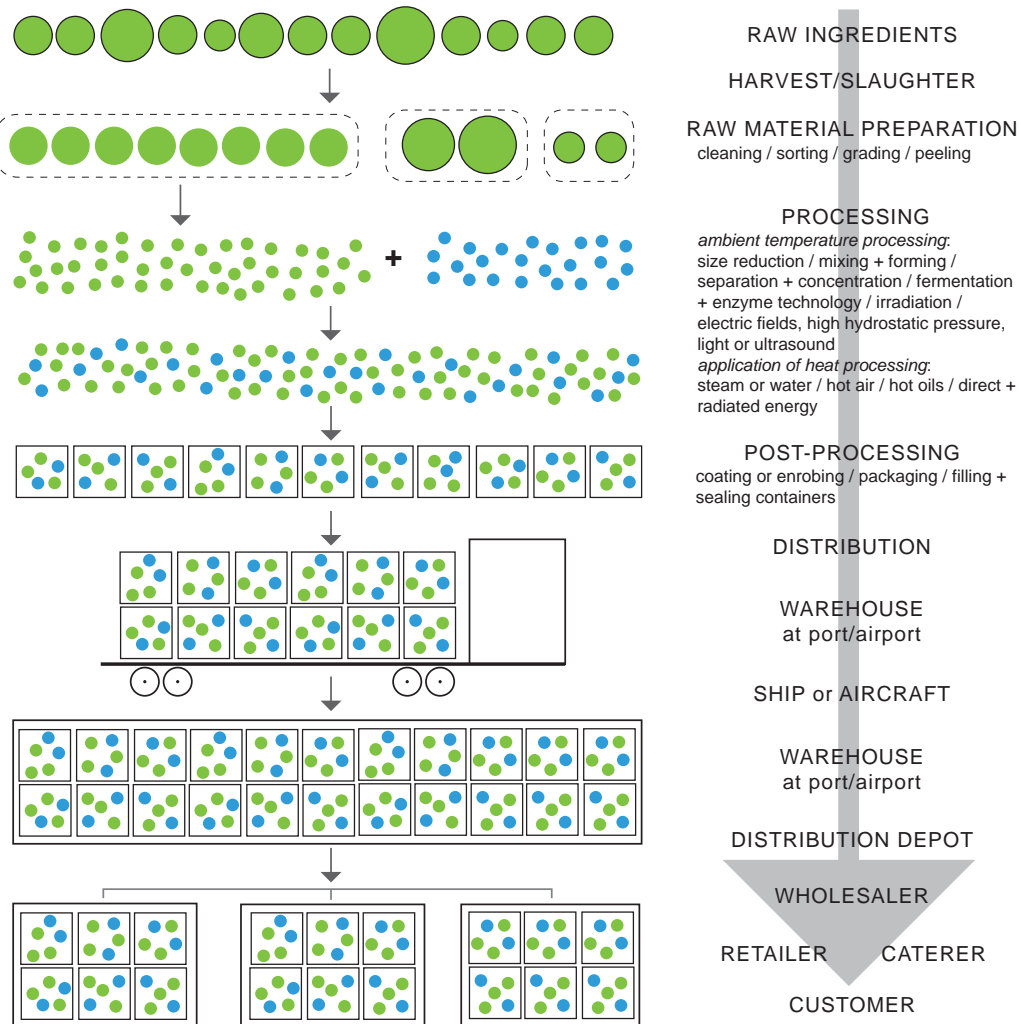
Victory Garden posters and advertisements put out by the USDA and US government during the World Wars <sup>36-38</sup>.

## agribusinesses and factory farms

“In the United States an entire meal could be brought to you by the Philip Morris tobacco company under the misleading brand names of Sungold Dairies, Tombstone Pizza, Lender’s Bagel Bakery, and Kraft Macaroni and Cheese.”

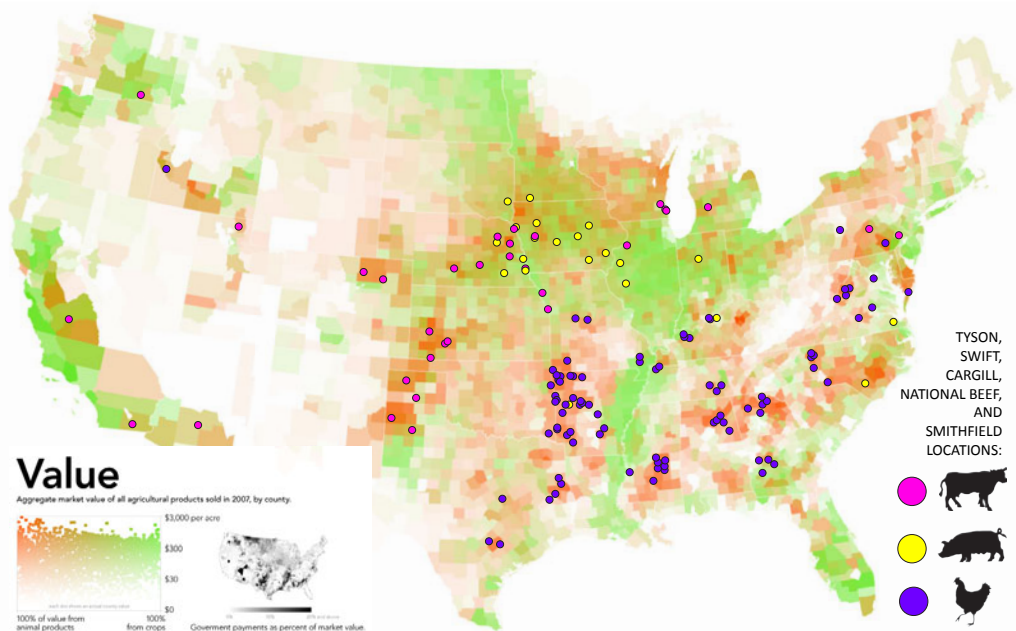
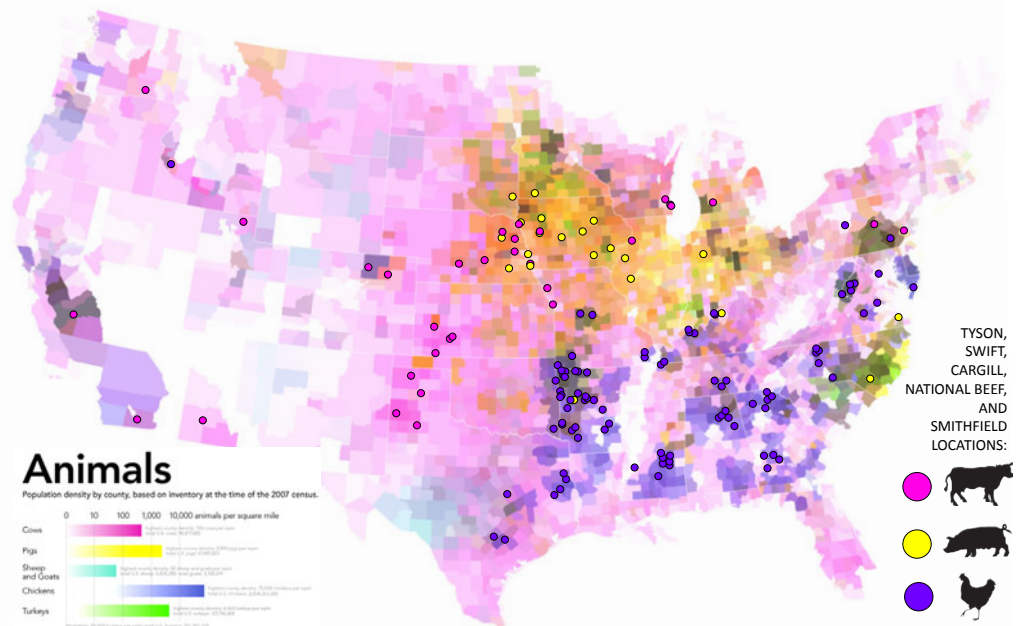
Lehman & Krebs \_ Control of the World’s Food Supply \_ 122

Today our agriculture systems in controlled by large-scale factory farms and transnational agribusinesses. The mass production of food by these factory farms and agribusinesses has provided consumer markets with inexpensive, standardized products. <sup>34</sup> With the rise of the car and the move to the suburbs post WWII the American consumers were paying more for the “added value” of convenience. Canned soup and cake mix in a box gave the consumer the idea of cooking but without the effort. <sup>35</sup> The mass-production system of agriculture has led to a new spatial pattern in the United States. In the early 1900’s many regions of the country were self-sufficient in producing commodities to be consumed by their residents. However today consumers depend on products that have been imported from places outside their region and even the nation. <sup>36</sup> This has resulted in large industrial farms that are clustered together in pockets throughout the country and farms that specialize in only one or two commodities. The links between local production and local consumption have been broken.



Andy Warhol. Campbell's Soup Cans. 1962.





Factory farms are a very small percentage of the farms in the country yet they are producing a vast majority of the food. In 1997 farms generating over \$500,000 a year in sales make up only 3.6% of all farms in the country. However they were operating on 20% of the farmland and accounted for 56% of all the farm sales.<sup>37</sup> In 1970 the top five beef packers (Swift, IBP, Armour, MSPXL, John Morrell) controlled 25% of the beef market. Today the top four companies (Tyson, Swift, Cargill, National Beef) control over 80%. Similar statistics are true of the pork and poultry markets as well.<sup>38</sup> Tyson Corporation has even changed the way birds are raised so they can be slaughtered in half as many days but twice as big. In 1950 it took 70 days to raise a bird for slaughter. Now it takes Tyson only 48 days.<sup>39</sup> This same has been true in plant agriculture. In 1910, 80% of American farmers grew vegetables, 50% grew potatoes, 47% produced apples, and 20% other fruits. By 1950 it was still a relatively diverse field, however by 1997 only 2.8% of American farmers produce vegetables commercially. Potatoes fell to only 0.6%, apples to 1.5% and other fruits was down to .4%.<sup>40</sup>

The effects of the chemical revolution can be seen in the field of corn production. In the early 1900s, 20 bushels of corn could be produced on 1 acre of farmland. Today, 200 bushels of corn is produced easily on the same 1 acre of land. Likewise we can see the effects of the biotechnology revolution in soybean production. Monsanto Corporation, an agricultural biotechnology company, was able to genetically modify the soybean seed in 1996. Within 12 years the percentage of soybeans in the United States with their genetically engineered gene went from 2% to 90%.<sup>41</sup>

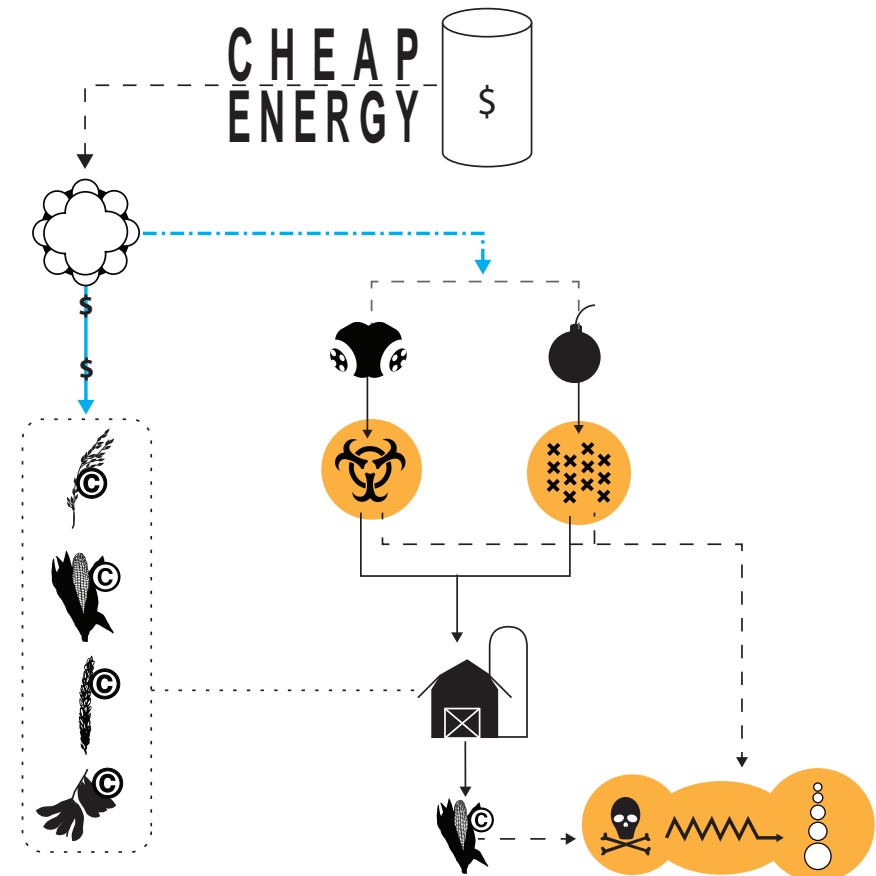


# incentives

“When we eat from the industrial-food system, we are eating oil and spewing greenhouse gases.”

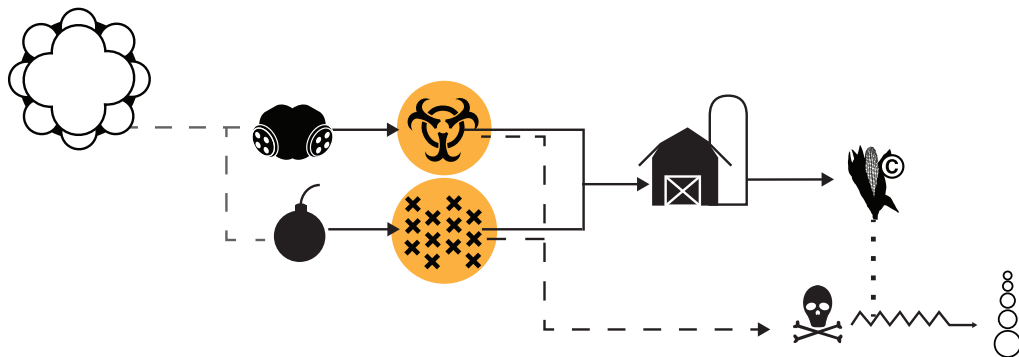
Michael Pollen\_Farmer in Chief\_2008

The industrial food system was designed to produce cheap calories in a great abundance, which it has proved to be successful at. But what was once a regional food economy is now national and increasingly global in scale due to cheap fossil fuel. As the second largest consumer of fossil fuel and the biggest producer of greenhouse gases there is no question that the industrial food system is gobbling up resources. The release of carbon is unavoidable in the clearing of land for crops and the tilling of soil however the industrialization of agriculture has increased the amount of greenhouse gases emitted by the food system through chemical fertilizers, pesticides, farm machinery, modern food processing, packaging, and transportation. The following issues are all linked and influenced by one another. These are incentives for change within the food system.



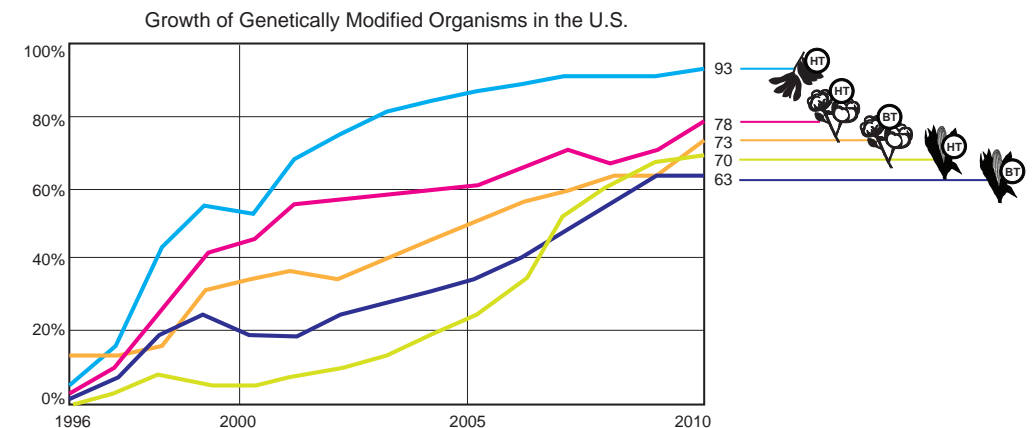
### pesticides + chemical fertilizers

The industrialization of the food chain can be characterized by a process of chemical and biological simplification at every link in the chain. Starting with the soil, chemical fertilizers are simplifying the biochemistry of the soil. The United States government after World War II sponsored the conversion of the munitions industry to fertilizer production featuring ammonium nitrate, the main ingredient of both bombs and chemical fertilizer. Synthesized nitrogen fertilizer is made from fossil fuels and features three macronutrients that plants need to grow (nitrogen, phosphorus, and potassium) and very little of anything else. However these harsh chemicals destroy the important biological activity in the soil. Without the biological ecosystems of the soil, crops become more vulnerable to pests and diseases and their nutritional quality is diminished due to a lack of minerals. According to the USDA, the nutritional quality of produce in America has declined since the adoption of chemical fertilizers in the 1950s. <sup>1</sup> Post World War II the United States government also supported the conversion of nerve-gas research into pesticides production. The industrial system of agriculture relies on high levels of nonrenewable inputs such as commercial fertilizers and pesticides. Biotechnology will not reduce this reliance but instead may even increase use of pesticides and fertilizers in an attempt to create a maximum yield. While these procedures may be feeding the world's population today, it is projected that in 50 years we will have 50% more people on the earth and by then many of the critical nonrenewable resources may be gone. <sup>2</sup>



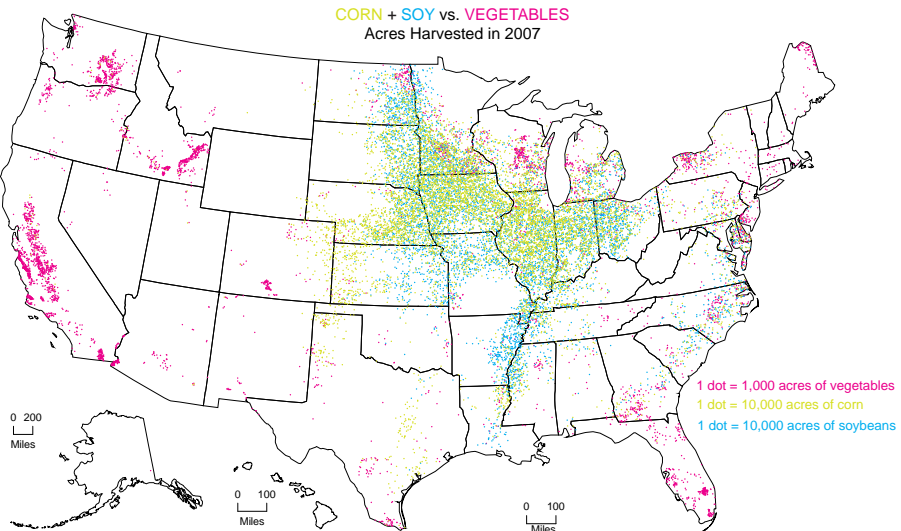
### genetically modified food

The latest trend of industrial agriculture is biotechnology. Genetically modified foods have become increasingly widespread. Genetic engineering was first developed in 1973 as a way for modifying plants and animals without sexual reproduction by moving individual genes physically from a source organism directly into the living DNA of a target organism. <sup>3</sup> The first GMO crop approved for sale by the FDA was the Calgene Company's "FlavrSavr" tomato in 1994, said to have an extended shelf life. Soon following was Monsanto Company's sale of "Roundup Ready" soybean plant, designed to reduce the cost of weed control. Followed by GMO varieties of corn and cotton as well. Supporters of GMOs list the benefits to be: pest resistance, herbicide tolerance, disease resistance, and extreme weather tolerance. There have been suggestions that the opposite could be true leading to reduced effectiveness of pesticides, harm to other organisms, and gene transfer to non-target species. <sup>4</sup> Since genetic engineering is a relatively new technology there has not been sufficient studies done yet on the effects or harms on the human body of genetically modified foods. It has also yet to be proven if GMOs will actually perform like the supporters suggest. 70% of all food commercially sold has at least some GMO content. Most of the time consumers are unaware that the product they are consuming has GMO content because there are no laws in the United States stating that GMO labeling is required. It is frightening to think that the number of GMOs in our food system is so high before it has been proven what effects they will have on the environment and human health.



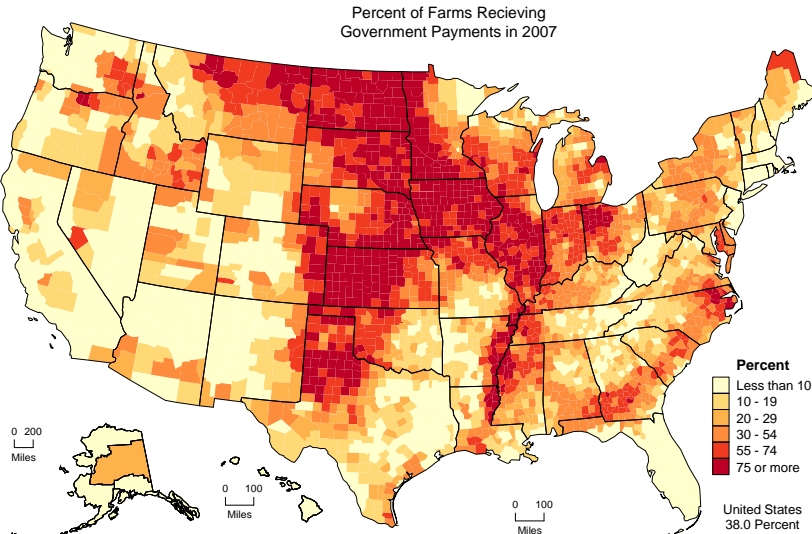
### simplification of our food

The simplification of our food system is an increasing trend of the industrialization of farming. The agricultural landscape of America is becoming a bleak landscape of monoculture crops. A century ago a typical farm in Iowa would have been raising more than a dozen different plant and animal species, today it only raises two: corn and soybeans. “Before the application of oil and natural gas to agriculture, farmers relied on crop diversity (and photosynthesis) both to replenish their soil and to combat pests, as well as to feed themselves and their neighbors.”<sup>5</sup> However cheap energy allowed for the creation of these monocultures and the simplification of the agricultural landscape and in turn the simplification of the food we eat. Corn and soybeans find their way into many of the foods offered in the supermarkets today, many times in the form of oils and sweeteners. Corn and soy are the two most planted crops in America because they are the most efficient transformers of sunlight and chemical fertilizers into carbohydrate energy (in corn) and fat and protein (in soy).<sup>6</sup> Most of the corn and soy goes into animal feed and most of the rest goes into processed food by being broken down into their chemical building blocks. Along with corn and soy, wheat and rice dominate the calories consumed by Americans today. This is alarming because we have been designed to consume “between 50 and 100 different chemical compounds and elements in order to be healthy and its hard to believe we’re getting everything we need from a diet consisting largely of processed corn, soybeans, rice, and wheat.”<sup>7</sup>



### farm subsidies

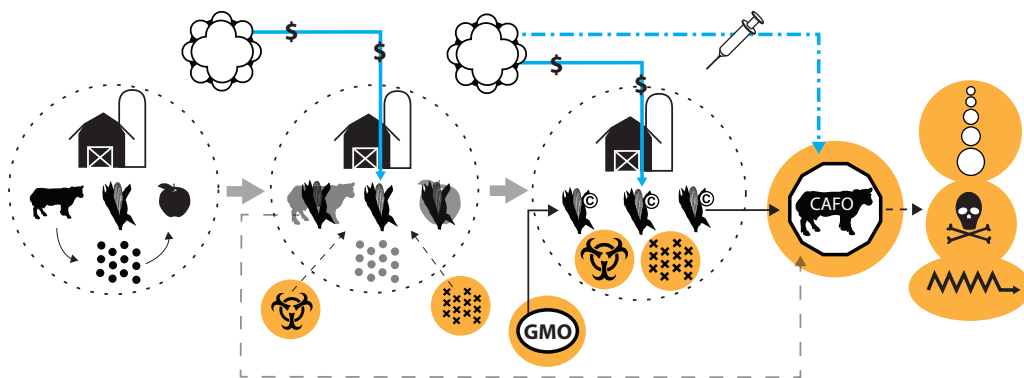
The government has encouraged the transition from polycultures to monocultures in the form of subsidies. Farmers receive pay for all the bushels of corn, soybeans, wheat and rice they can produce. Resulting in cheap grain that can be sold for substantially less than it costs to grow because the subsidies help make up the difference. This not only drives down the cost of grain but also drives down the cost of all processed foods that are derived from the grain.<sup>8</sup> The bulk of the Federal subsidies go to the largest farm operations and put small family farms at a serious disadvantage. From 1995 to 2009 the largest and wealthiest 10% of farm program recipients received 74% of all farm subsidies with an average total payment over 15 years of \$445,127 per recipient. On the other hand the bottom 80% of farmers received an average total payment of just \$8,682 per recipient.<sup>9</sup> The vast majority of farm subsidies go to raw material for our industrialized food system, not the foods we actually eat. Even less money goes to support the production of the fruits and vegetables that are the foundation of a healthy diet. Instead of supporting the small farmers to produce a diversity of crops the government is feeding the rich agribusinesses with money to produce raw material for highly processed food with disregard to the environment and America's health.





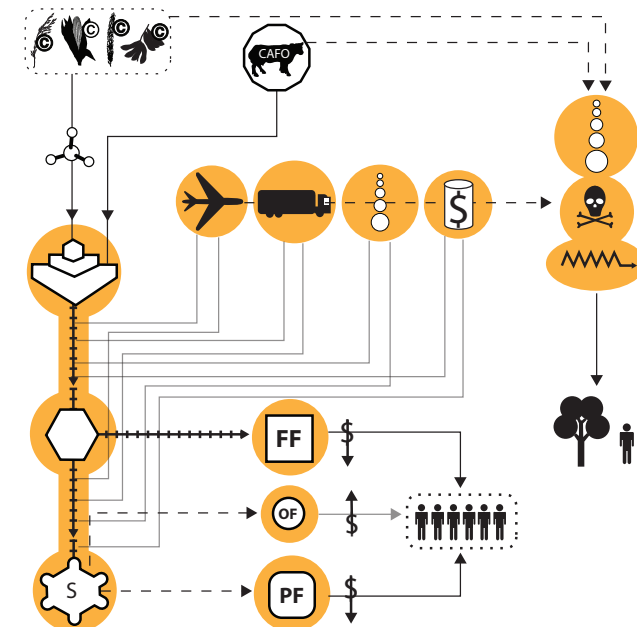
## monocultures

The subsidized monocultures of grain led directly to the monocultures of animals. Because grain was so inexpensive, farmers could fatten animals faster and cheaper. Concentrated animal feed operations (CAFOs) became increasingly popular and the price of meat became very affordable for the consumer. Because CAFOs were able to produce lots of meat for a cheap price, farms couldn't compete which caused the movement of animals off the farms and into feedlots. With this movement, we saw the average consumption of meat go from a special occasion to an everyday routine. Instead of the animals' waste being a source of fertility to the farm, it became a problem on the feedlot. Taking animals off the farms and putting them on feedlots reversed the solution of animals fertilizing the land that crops deplete and left us with a fertility problem on the farm and a pollution problem on the feedlot. In place of the animal fertilizer on the farm, synthetic fertilizer is used. And instead of animal waste being recycled on the farm through fertilization, it is collected in large quantities and turned into toxic waste, which is transferred into the air in the form of greenhouse gases and into water through run off which pollutes the environment not just locally but also miles and miles away. <sup>10</sup> The F.D.A. approves the routine use of antibiotics in feed, which allows for animals to survive in the crowded and dirty CAFO environments. The antibiotics also lead to the evolution of drug-resistant bacterial diseases and to outbreaks of E. coli and salmonella poisoning. <sup>11</sup>



## health risks

With the mass production of corn and soy to be turned into highly processed food comes an American diet based on quantity rather than quality which has led to an increase in people who are overfed and undernourished. Four of the top 10 killers in America today are chronic diseases linked to diet: heart disease, stroke, type 2 diabetes and cancer. From 1960 to now spending on health care has risen from 5% of the national income to 16%. During that time spending on food has fallen from 18% of household income to less than 10%. <sup>12</sup> The durability of the cash crops seeds makes them capable of being stored for long periods of time. And along with the profitability of turning cash crops into meat, dairy, and processed foods, it makes them appealing to the needs of industrial capitalism. But they are not appealing to our country's health. A combination of an oversupply of macronutrients found in corn, soy, wheat, and rice, and a undersupply of leafs, which provide the body with critical nutrients, is leading to soaring rates of obesity and diabetes. <sup>13</sup> The unhealthy grain based diet costs an estimated \$250 billion a year in diet-related health care costs and an American born today face a 1 in 3 chance of developing diabetes in his or her lifetime. Many times diabetes could be prevented just by the change of diet and exercise.



# policies

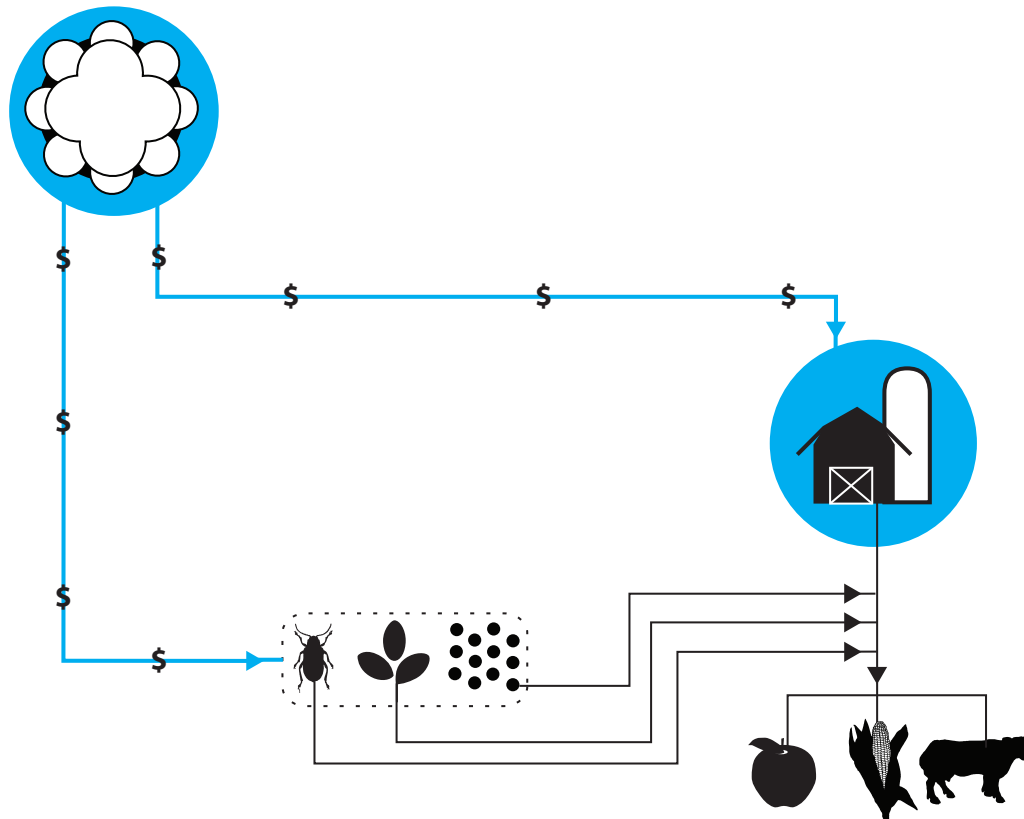
“The health of a nation’s food system is a critical issue of national security.”

Michael Pollen\_Farmer in Chief\_2008

Policy change is imperative in national food system reform. As discussed above there are a number of harmful practices that have been supported and subsidized by the federal government. There is no reason in today’s world of crises that the food system, in which all people are dependent upon, be one that is so destructive and unhealthy. Without a change in policies that control our unsustainable food system we will be forced with further problems in health care, energy independence, and climate change. These policies will influence the creation of and support of stimulants in which we can start to transform our food environment.

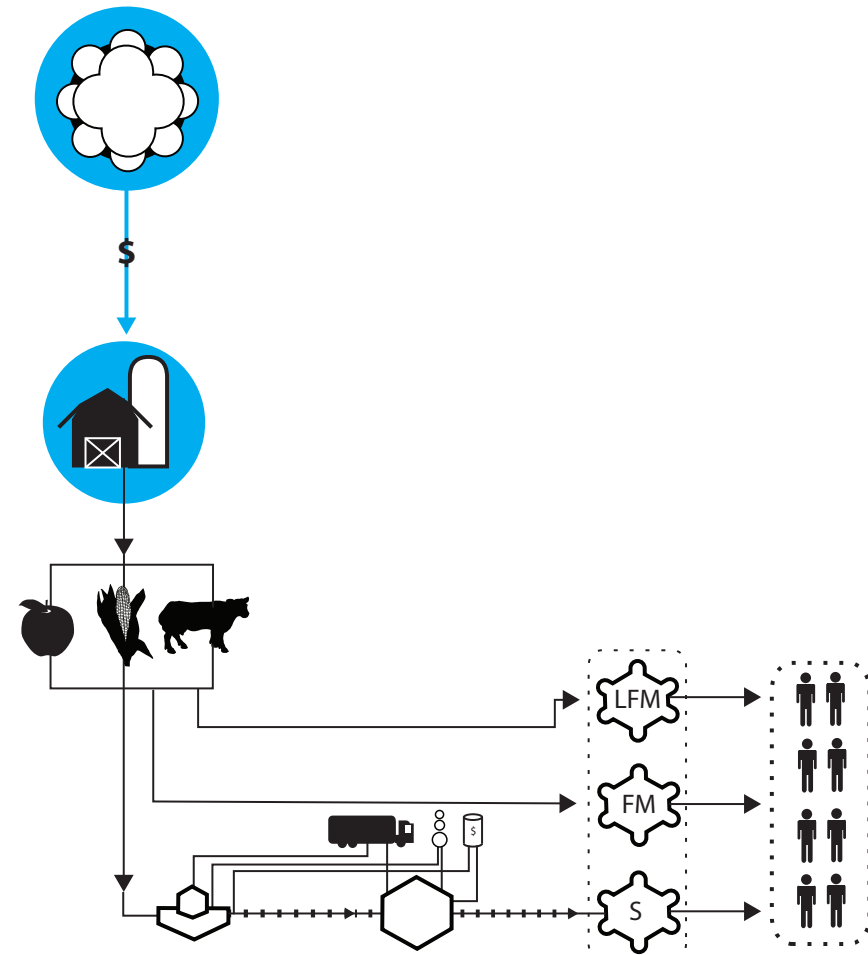
### support small-scale farms

1. Provide subsidies to organic farms
2. Provide access to sustainable technologies, credit and marketing infrastructure
3. Provide assistance to adjusting to climate change and environmental stresses
4. Increase public investments in rural areas and farmers organizations
5. Value farmland and make it available to new farmers



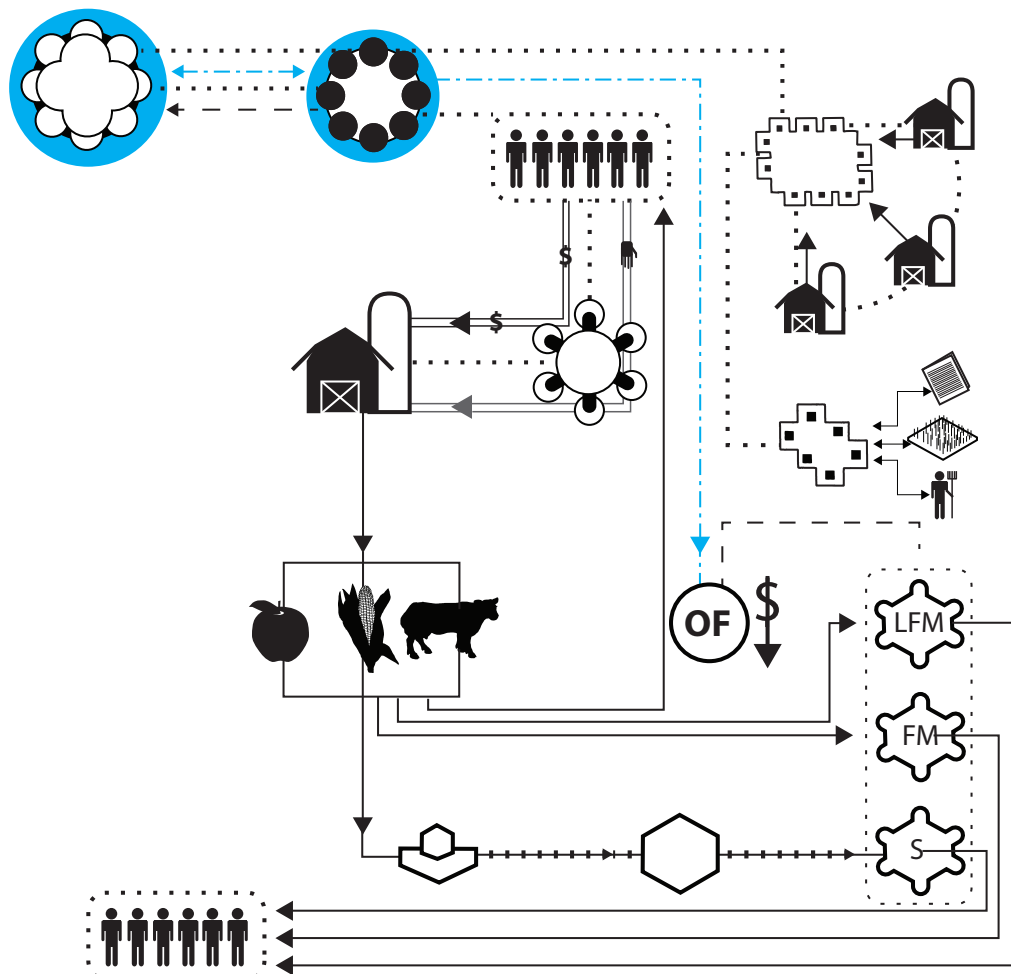
### invest in local and regional systems

1. Localize or regionalize food processing, procurement, and distribution
2. Encourage urban agriculture
3. Foster partnerships between rural and urban communities and both private and public agencies
4. Increase investments in resource conservation and pollution prevention
5. Expand incentives, grants, and education to support sustainable practices



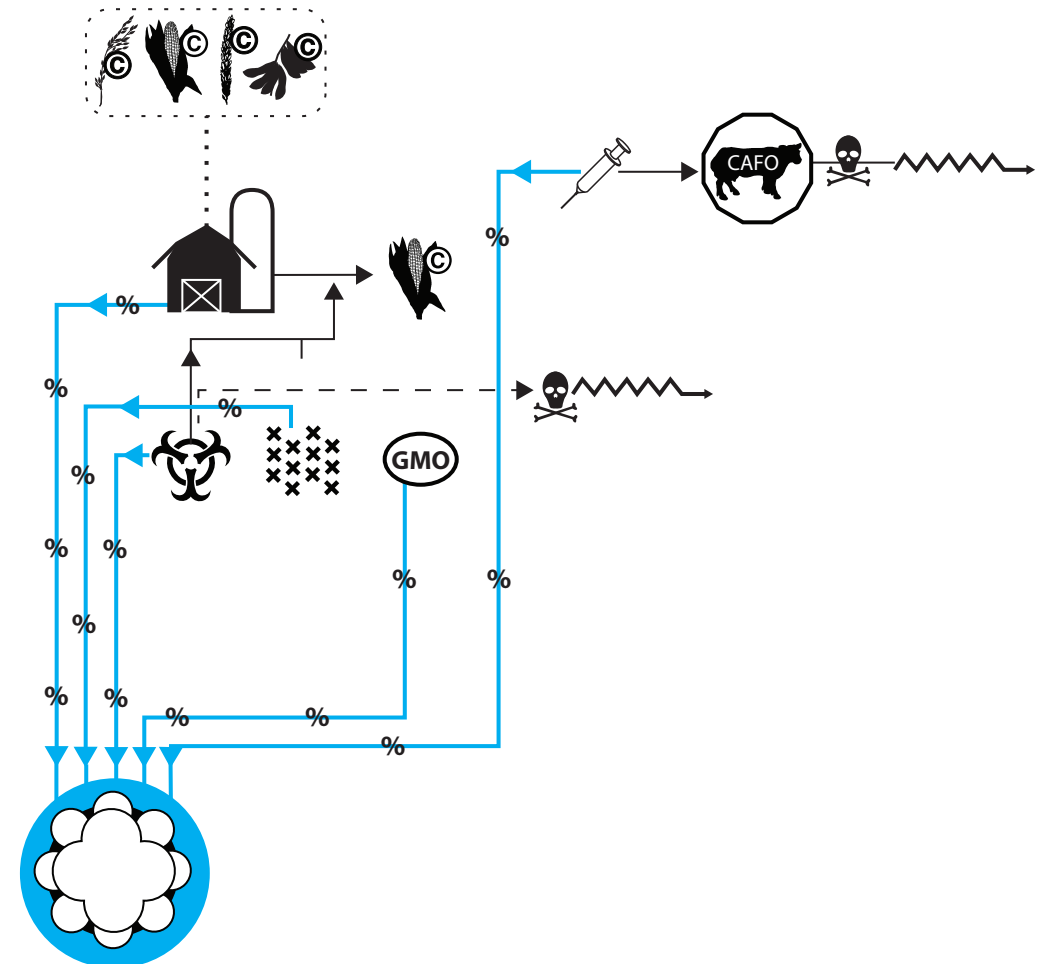
## improve equity and distribution in the sustainable food sector

1. Develop new markets
2. Increase distribution to all consumers and to public institutions
3. Support small business
4. Expand access to organic food by all consumers in all income levels
5. Regulations to prevent market monopolies



**prevent the use of environmentally harmful practices**

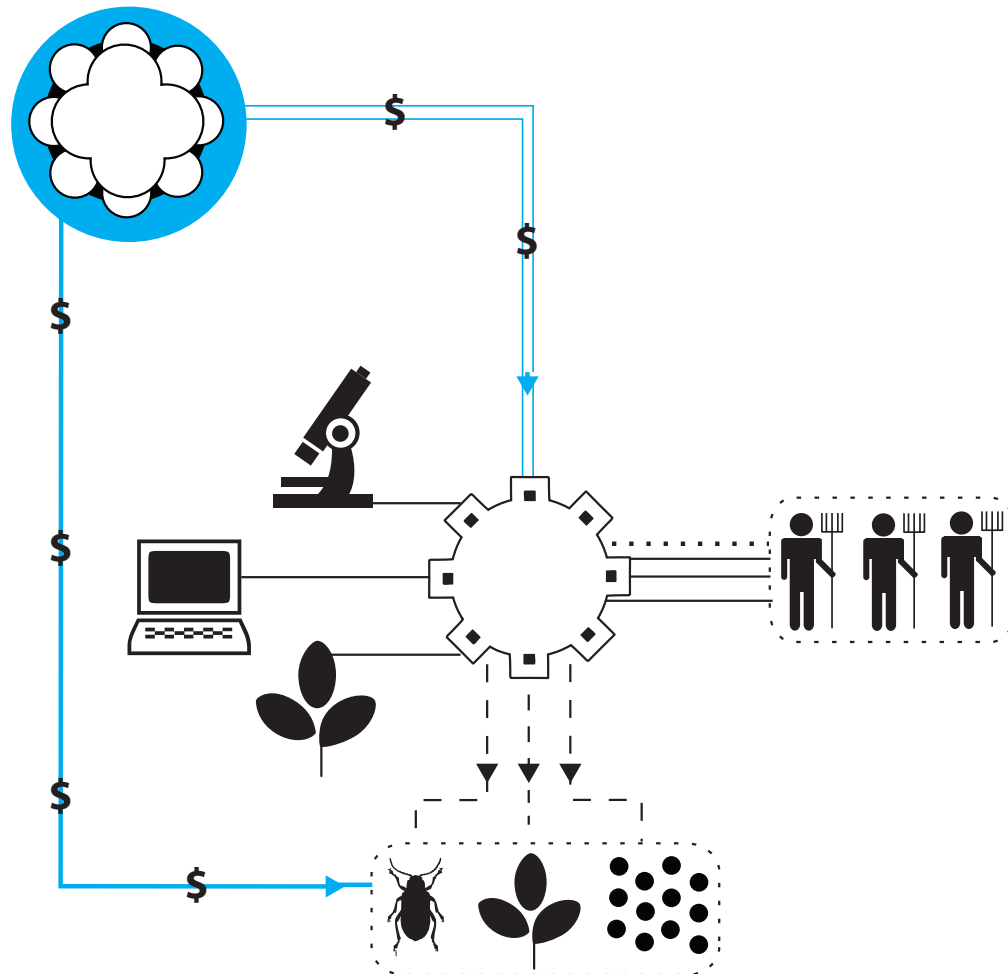
1. Increase corporate accountability of sustainable practices
2. Strengthen law enforcement to stop harmful practices
3. Taxing of: pesticides, chemical fertilizers, antibiotic fee, GMOs, monocultures
4. Remove subsidies to agribusinesses and cash crops [corn, soybeans, wheat, rice]
5. Eliminate CAFOs





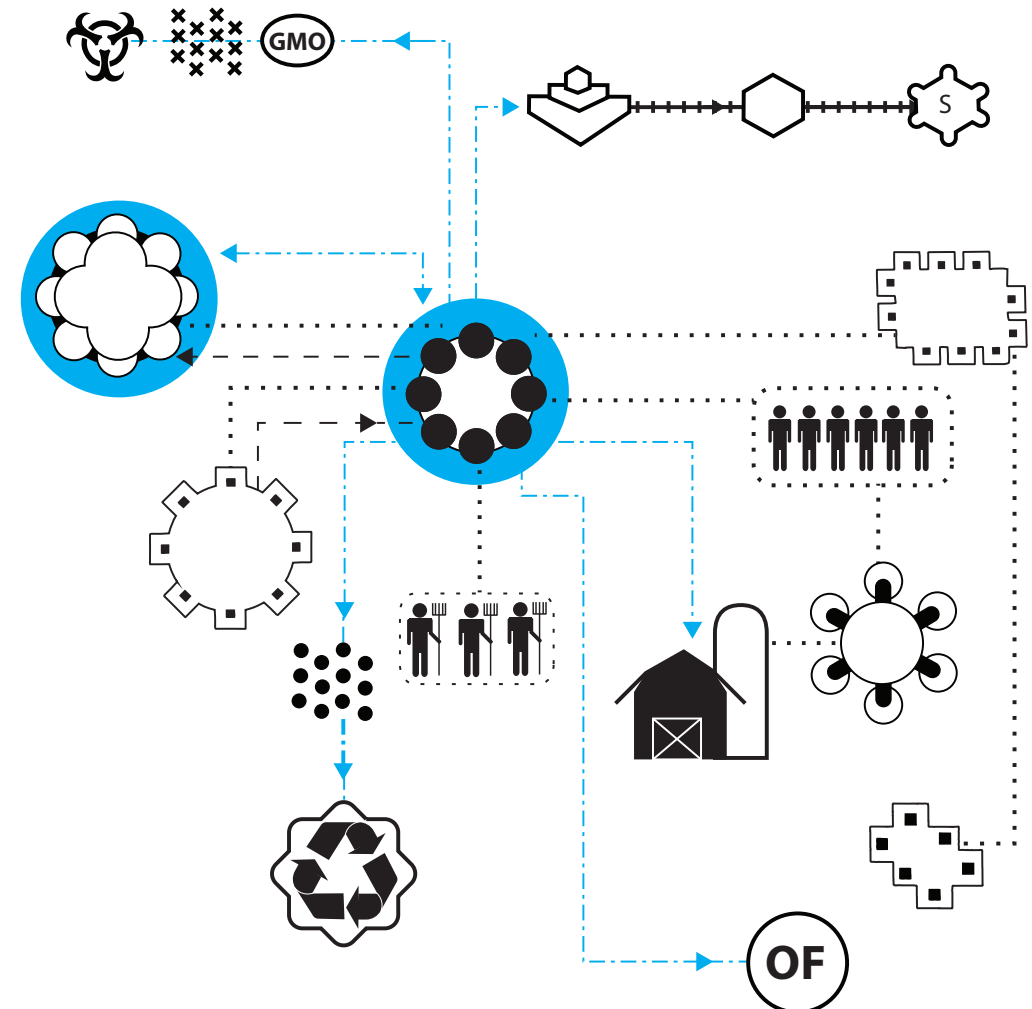
### build capacity in agroecology

1. Increase investments in agroecological sciences, research, and education
2. Support land-grant universities



### implement fair trade and market oriented policies

1. Improve the quality of agricultural trade governance
2. Market-oriented public-policy options to reorient food systems toward sustainability
3. Regulate fair seed distribution
4. Develop food-policy councils



# stimulators

“A sustainable agriculture must be capable of meeting the needs of the present while leaving equal or better opportunities for the future”

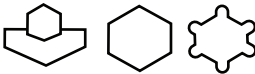
John Ikerd \_ Crisis & Opportunity \_11

With the support of the policy changes discussed above programmatic pieces and systems can begin to act as “stimulators” in our food environment. Examples of the following proposed stimulators exist to some degree in our environment today. But through the support of new policies to support sustainable practices and new programs instead of destructive, industrial ones these stimulators can start to stimulate our environments. As with any system, it is the combination of different parts or components, which strengthens the whole. The stimulators can’t function without the support of the policies and collaboration with other stimulators. When pieces of the network which begin to link into one another is when we can start to see a sustainable food system in which each stimulator instigates change and encourages development or progress in the environment around it.

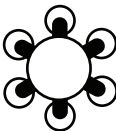
LAND-GRANT UNIVERSITIES



LOCAL FOOD DISTRIBUTION



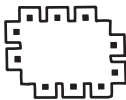
COMMUNITY SUPPORTED AGRICULTURE



LOCAL FOOD POLICY COUNCILS



INSTITUTIONS



ELEMENTARY SCHOOLS



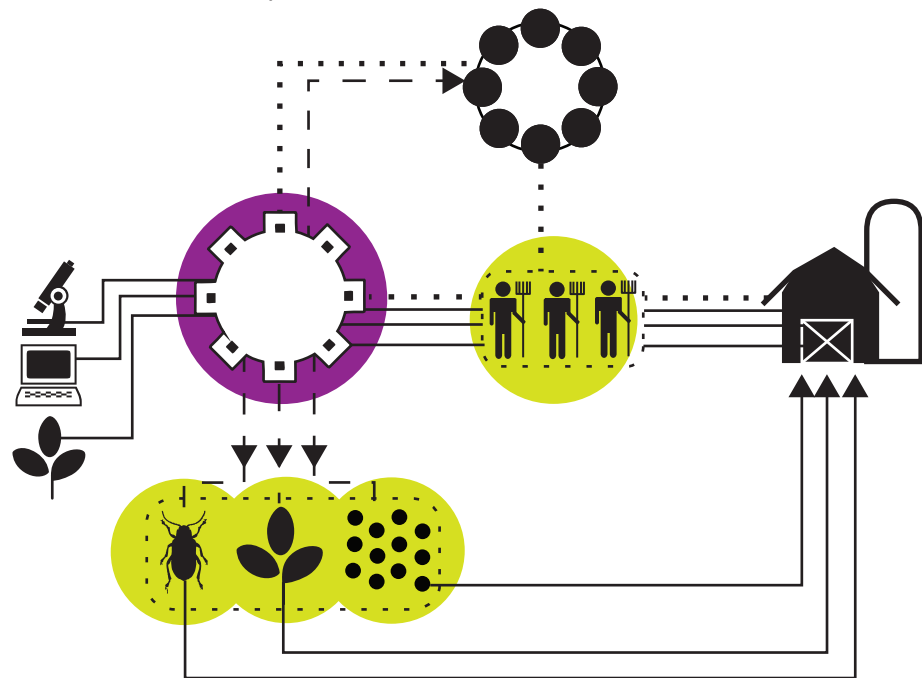
COMPOST RECYCLING PROGRAMS



## land-grant universities

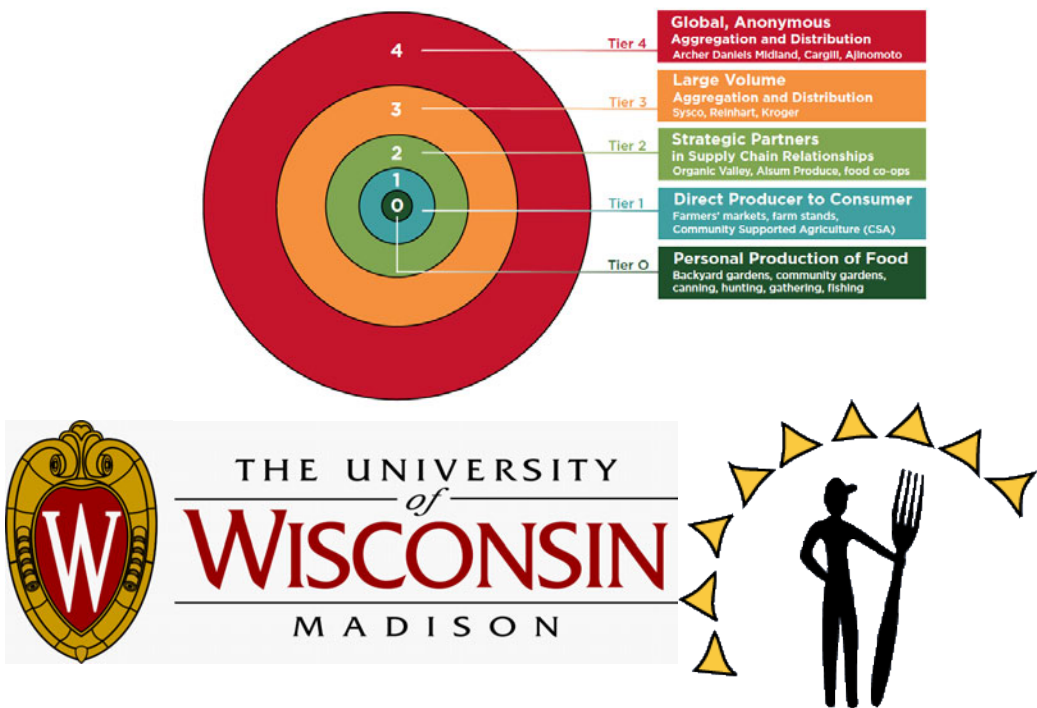
Use the existing network of the Land-Grant Universities developed in 1862 across the country as sustainable agriculture research hubs and education centers. The Land-Grant Universities were created with an institution to teach agriculture and later added agricultural experiment stations. Instead of researching and pursuing industrial farming techniques, these new research hubs will stimulate the education of sustainable practices that can support the new food system. The new Agriculture Schools will act as stimulators by doing the following:

- Create agroecological science research and development centers.
- Research and develop sustainable farming techniques and technologies.
- Train farmers, both new and old, in sustainable practices.
- Share knowledge with farmers on sustainable practices.
- Create “green-jobs” in the field of farming and agriculture research.
- Influence local food policies.



## center for integrated agricultural systems

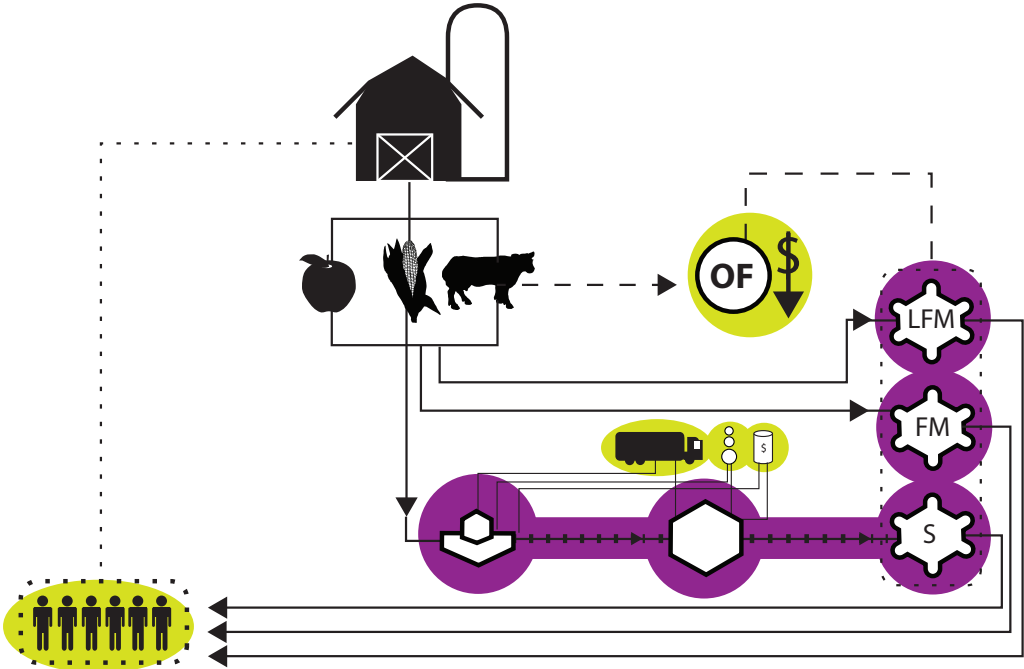
The Center for Integrated Agricultural Systems (CIAS) is a research center at the University of Wisconsin-Madison's College of Agricultural and Life Sciences. The goal of the work at CIAS is to “learn how particular integrated farming systems can contribute to environmental, economic, social, and inter-generational sustainability.” The CIAS provides outreach and education programs to help farmers, educators, crop consultants, businesses and eaters put their research findings to use. The research center focuses on sustainable systems such as: integrated farming systems, biological pest control, and integrated cropping systems as well as training new farmers and supporting local food systems and community supported agriculture. <sup>1</sup>



# local food distribution

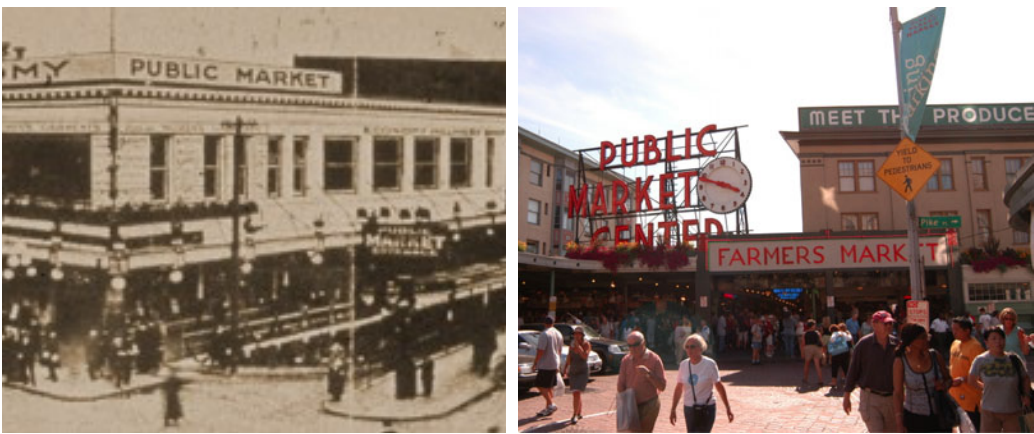
Develop local and regional food chains which connect small farmers to markets for consumption. The ideal local food distribution system is one that links consumers to farms in a sustainable system which promotes health and fairness from the farm to the market. A sustainable food distribution system includes the following:

- Local and regional food chains
- Connection between small-farmers and markets for consumption
- Year-round indoor farmers markets or local food markets and conventional supermarkets which support the local system
- Equity and fair pay for farmers and food producers
- Decreased ecological footprint of production, packaging, and shipping.
- Making local/regional food and meat competitive in the market



# pike place market

Pike Place Market is one of the oldest continually operated public farmers' markets in the United States. The markets birth was due to citizen's anger with the cost of onions increasing between 1906 and 1907. In August of 1907 a public street market was opened to connect farmers directly to consumers so the customers could "Meet the Producer" directly. This was the philosophy on which Pike Place Market was founded and is still the foundation of the market's businesses today. It opened with great success; on the first day of business in 1907 there were 8 farmers with wagons and 10,000 customers. By the end of the year the first market building opened. Today the market is known as one of the premier farmers' market in the country. <sup>2</sup> While the market has become a tourist attraction and what might be considered a "festival marketplace, it is still a farmers market that is open year round creating a market for local produce.

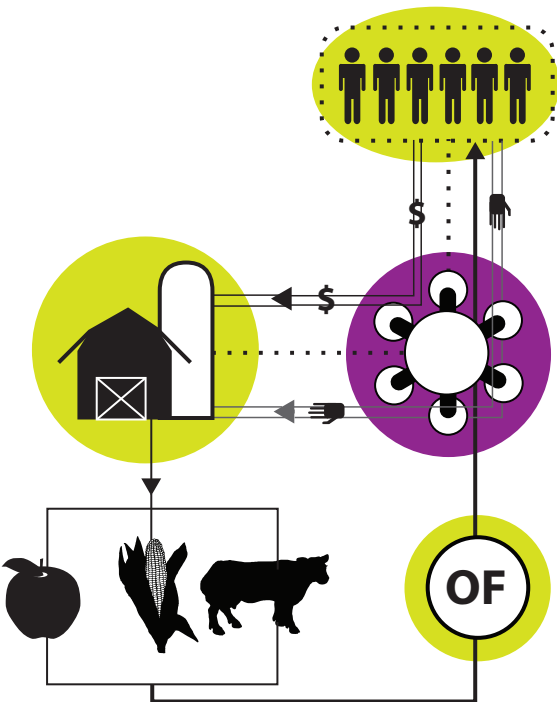


Left: Historic image of Pike Place Market. <sup>42</sup> Right: Modern day image of Pike Place Market. <sup>43</sup>

## community supported agriculture

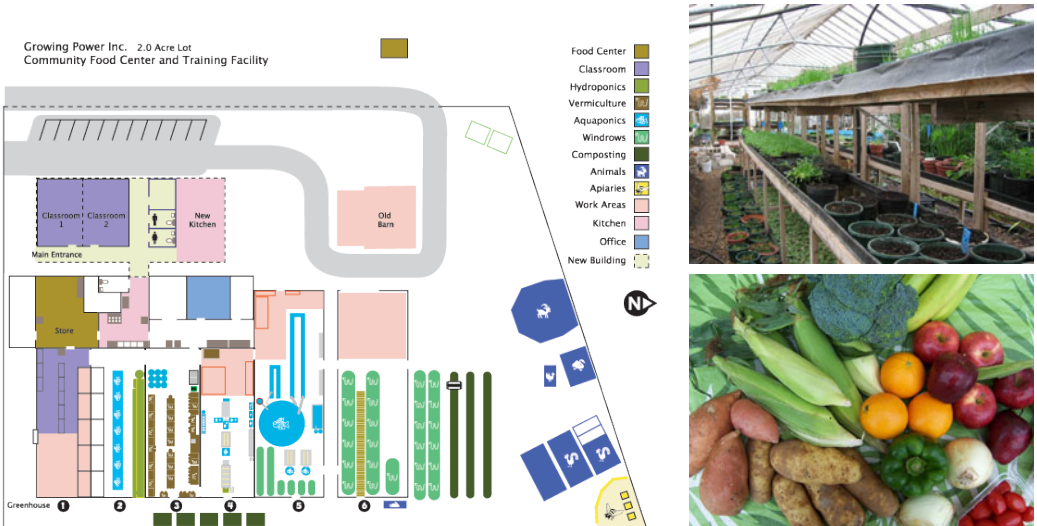
Expand current model of CSAs to make accessible to a wider range of people. Community supported agriculture models should be expanded to allow for community members to commit either money or labor in exchange for weekly produce. The community supported agriculture model provides a mutual benefit to the farm and the consumer through the following ways:

- Connect people within a community to local farms. The community understands where their food is being produced and therefore creates a visibility in the food system that is currently missing.
- Community members provide funding or labor in exchange for organic produce which allows for more community members to become involved and have access to fresh organic food regardless of income status.
- Generates “green jobs”.



## growing power

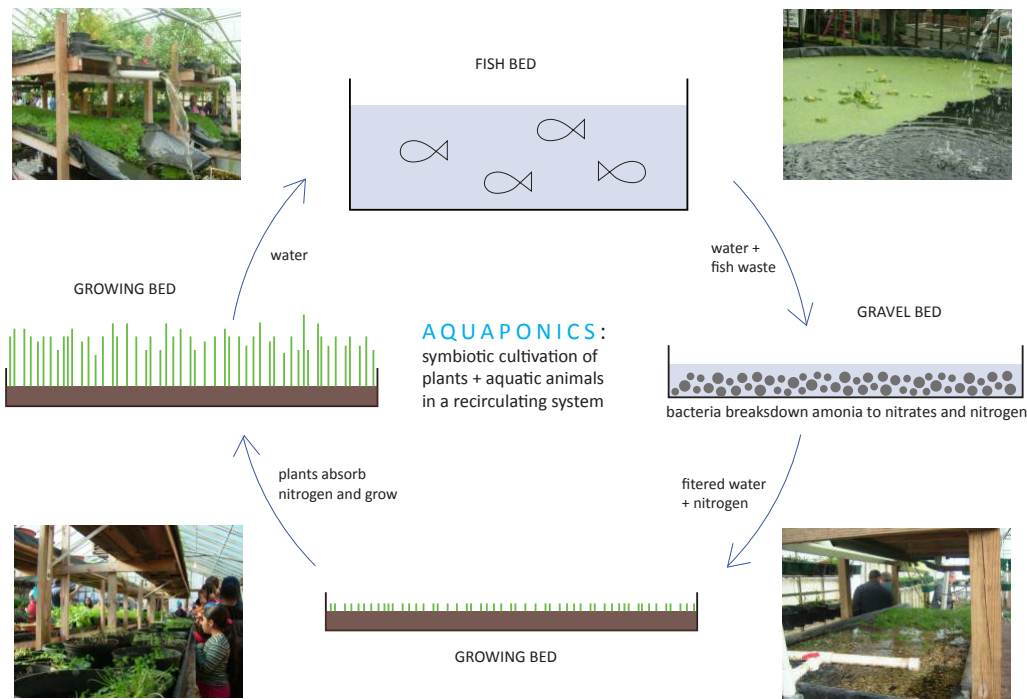
Growing Power, started by Will Allen in 1993 is a Milwaukee based nonprofit organization and land trust which supports the environment we live in by providing equal access to healthy, high-quality, affordable food of all people. Growing Power's headquarters is an urban community food center in Milwaukee which is a prototype where people can learn sustainable practices to grow, process, market, and distribute food. The center consists of 2 acres with over 20,000 plants and vegetables, fish, chicken, goats, rabbits, and bees supported by many sustainable practices. The store at Growing Power's urban farm in Milwaukee is the only place for miles that carries fresh produce, free-range eggs, grass-fed beef, and homegrown honey. Supplementing its own food production with food from the Rainbow Farming Cooperative, also started by Will Allen, Growing Power makes “Farm-to-city Market Baskets” which are sold for \$16 and contain a week's worth of 12 - 15 varieties of produce which feeds 2 to 4 people for a week. During the spring, summer, and fall months the food in the ‘Market Baskets’ come from Growing Power's Farms in Milwaukee, Merton and Oak Creek, and the Rainbow Farmer's Cooperative (small, family farmers in the South). In the winter months the food comes from Growing Power's greenhouses in Milwaukee and the Rainbow Farmers' Cooperative and small-scale, locally or family owned wholesalers.<sup>3</sup>



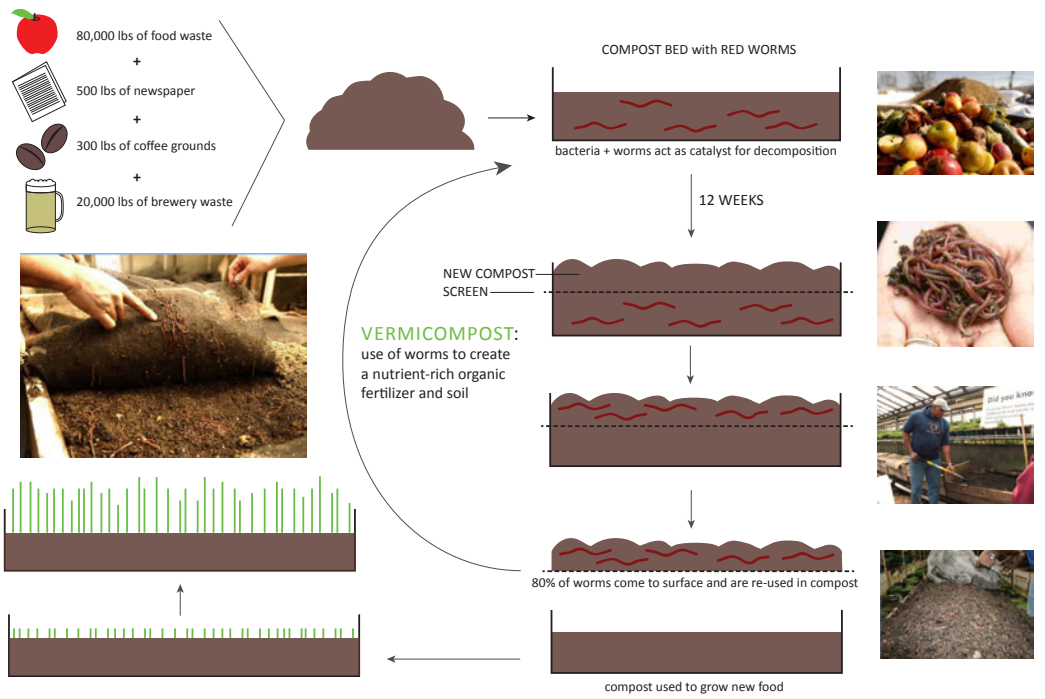
Clockwise from left: Plan of Growing Power's urban community food center. Inside of a Growing Power greenhouse. Market basket example.



Growing Power's urban community food center features an **aquaponics** system in which there is a symbiotic cultivation of plants and animals in a re-circulating system. Growing Power's system raises tilapia and yellow perch to fertilize a variety of crops and herbs. The choice of tilapia and yellow perch is because they grow fast and are marketable to restaurants and markets. The system uses gravity as a transport system to take water from fish tank to gravel beds where bacteria breaks down the toxic ammonia from the fish waste into nitrate and then nitrogen, which is a key ingredient for plant growth. The filtered water is then transferred to growing beds in which salad greens and tomatoes are grown. Finally the water recirculates back to the fish tank. <sup>4</sup>



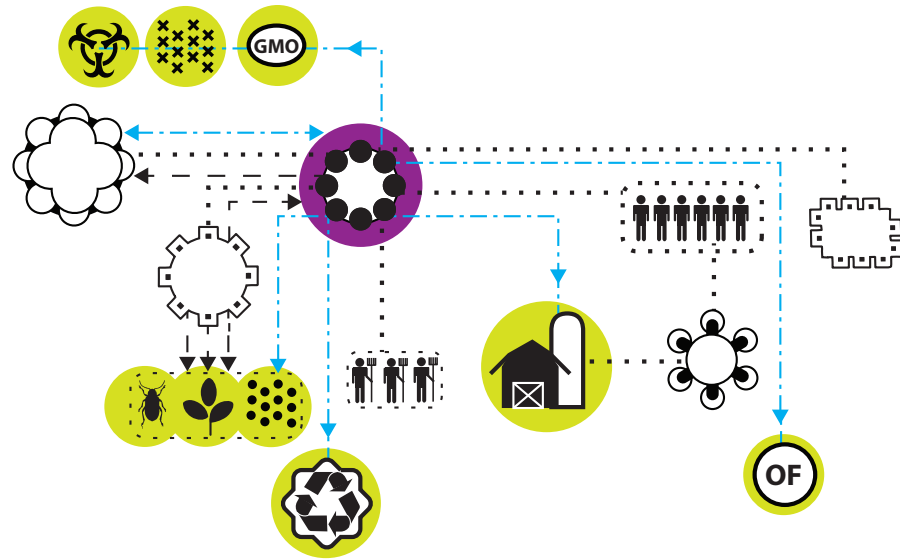
Growing Power creates their own compost to fertilize their plants. Their compost is made from recycled food waste, farm waste, brewery waste, and coffee grinds which they collect from local businesses (100,000 pounds of waste collected a week). Growing Power uses **vermicomposting** (worm compost) to combine the recycled waste with worm castings to create an sustainable product that is rich in nutrients. They use two methods for vermicomposting: a raised bed or worm bin system which is a 12 week process in which decomposed compost is turned into nutrient worm castings and a static pile system called a windrow, which consists of bedding materials for the worms to live in and break down the compost. The vermicompost system creates a fertilizer with a higher nutrient ratio than other composing methods. <sup>5</sup>



local food policy councils

Develop local, regional and national food policy councils in order to govern and manage sustainable food systems. By working with the national government, the local food policy councils can play an extremely important role to do the following:

- Enforce sustainable practices through out all levels of food production.
- Collaborate with community members and farmers to encourage community involvement in maintaining sustainable systems and food policies.
- Assist farmers in accessing resources and maintaining sustainable practices.
- Enforce taxing of harmful practices ie: pesticides, synthetic fertilizer, GMOs, CAFOs, and antibiotic feed.
- Support and collaborate with the federal government.
- Sponsor public health campaigns to promote healthy food and lifestyles.



national alternative agricultural model

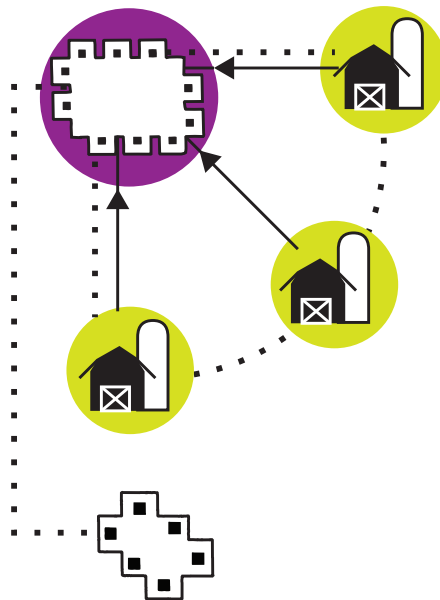
Havana, Cuba is an example of actively promoted urban agriculture creating a unique local food system. Urban agriculture arose in Cuba as a need for survival when the Soviet Bloc collapsed in 1989 resulting in a loss of more than 75% of its import and export capacity. <sup>6</sup> In response Havana’s city government developed a national alternative agricultural model (NAAM) which encouraged residents to use every single piece of open land to produce food for direct consumption. The model replaced high levels of imported agricultural inputs with alternative, sustainable methods and restructured the land property pattern of the large state-owned farms into smaller units of co-operative property. A strong support for organic production and link between research and application of technology, such as bio-fertilizers and worm composting, has created a unique situation in which organic vegetables are the cheapest option. The production of urban agriculture has been linked to social institutions such as kindergartens and hospitals, and schools have implemented an urban agriculture field of study. The participation developed at the community level makes it a successful combination of top-down and bottom-up approaches. <sup>7</sup>

|   | location | cultivators | consumers | yield  |
|---|----------|-------------|-----------|--|
| COMMUNITY GARDEN PLOTS<br>'HUERTOS POPULARES PARCELA'         |          |             |           |  |
| A<br>less than<br>1,000 m <sup>2</sup>                        |          |             |           | 8-12 kg<br>per<br>meter <sup>2</sup><br>per year |
| INTENSIVE CULTIVATION GARDEN<br>'HUERTOS INTENSIVO'           |          |             |           |  |
| B<br>1,000 to<br>3,000 m <sup>2</sup>                         |          |             |           | 8-12 kg<br>per<br>meter <sup>2</sup><br>per year |
| URBAN COMMUNITY GARDEN<br>'ORGANOPONIC POPULARES'             |          |             |           |  |
| C<br>2,000 to<br>5,000 m <sup>2</sup>                         |          |             |           | 20 kg<br>per<br>meter <sup>2</sup><br>per year   |
| STATE FARMS<br>'AUTOCONSUMOS ESTATALES'                       |          |             |           |  |
| D<br>10,000 m <sup>2</sup>                                    |          |             |           | 0.6 kg<br>per<br>meter <sup>2</sup><br>per year  |
| HIGH YIELD URBAN GARDENS<br>'ORGANOPONIC DE ALTO RENDIMIENTO' |          |             |           |  |
| E<br>over<br>10,000 m <sup>2</sup>                            |          |             |           | 25 kg<br>per<br>meter <sup>2</sup><br>per year   |

## institutions

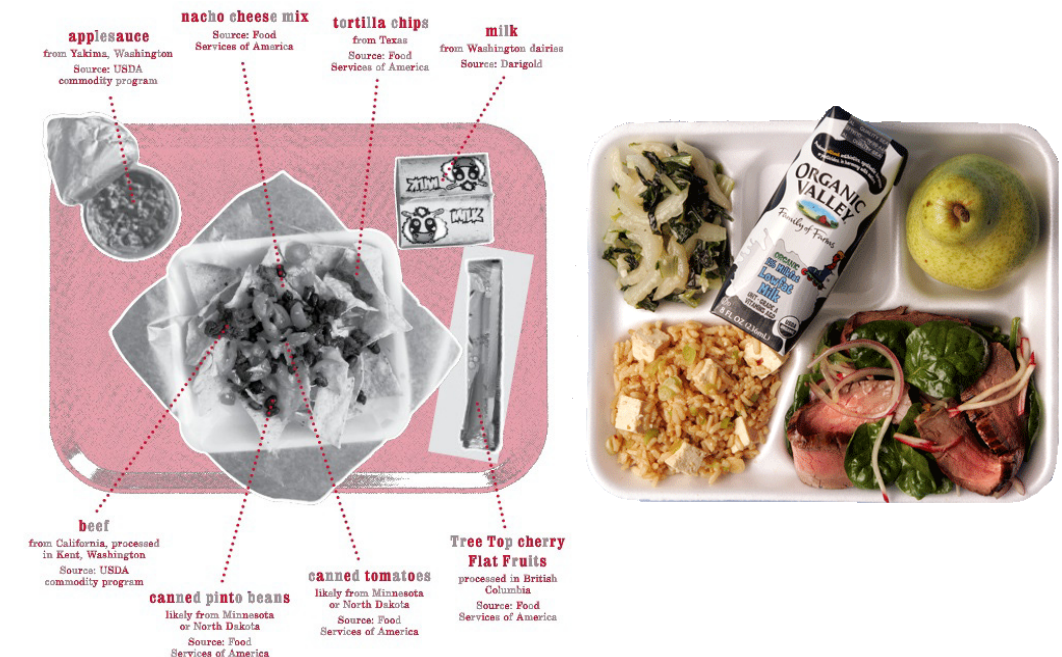
Foster relationships and partnerships between local and regional farms and institutions such as public schools, hospitals, colleges and universities to supply a majority of the food used for daily consumption:

- Consumption of locally sourced food by institutions will support local farmers and encourage a local food economy.
- Improve the quality of food served to students/employees/visitors of the institutions.
- Foster sustainable institutions.
- Decrease the distance food has to travel to feed the institutions.



## farm to school programs

Farm to School is a program that connects K-12 schools with local farms to serve healthy meals in school cafeterias with the goals of improving student nutrition, providing agriculture, health and nutrition education opportunities, and supporting local and regional farmers. The program also includes waste management programs such as composting and experiential learning opportunities such as planting school gardens, cooking classes, and farm tours. Farm to School helps local farmers by creating new direct markets. The program also aims to teach students about the path from farm to fork. The program has expanded from a few in the 1990's to over 2,000 in 2010. Ann Cooper, the executive chef of the Berkeley, California public schools, took over a typical school-lunch program and transformed it into a healthy school lunch program, where the food was sourced from local and regional farms instead. This meant not only a much healthier meal for the children but support for the local farm economy.<sup>8</sup>



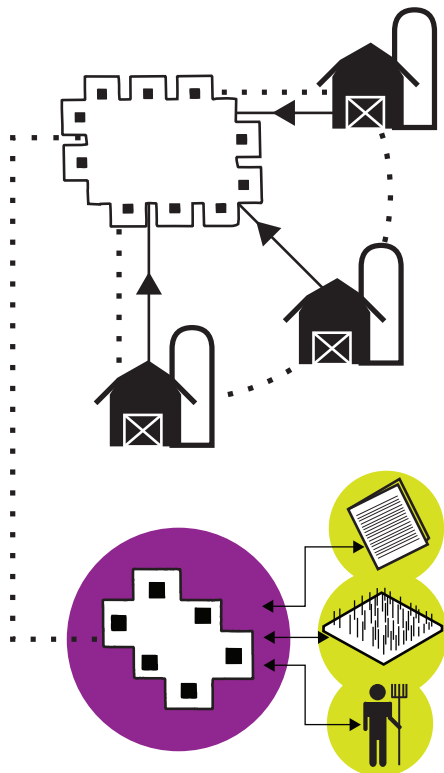
On the left a typical school lunch whose ingredients may have traveled 7,500 miles from their source versus one of Ann Cooper's organic and locally sourced lunches from the Berkeley school system.<sup>47-48</sup>



## elementary schools

Focusing on young children to stimulate change within society through “edible education”. By latching on to an existing program the “edible” elementary schools can add value to the education system as well as the food system and the school lunch program it is a part of by doing the following:

- Teach students to grow, cook, and enjoy food.
- Plant gardens at every elementary school in which students play an active role in maintenance and cultivation.
- Equip schools with kid friendly kitchens.
- Train lunchroom workers who can cook and teach children.
- Source school lunch food from local and regional farms.



## the edible schoolyard

The Edible Schoolyard garden is an acre of land on the Martin Luther King Junior Middle School grounds located in Berkeley, California. The garden was transformed from an abandoned lot into a garden that thrives with vegetables, herbs, vines, berries, flowers and fruit trees. A 40 year old bungalow next to the garden was turned into a bright and cheerful kitchen. The students harvest the food and then cook in the kitchen as part of the curriculum of history and science. The students learn about culture, history, language, ecology, and math through the preparation of food which they harvest from the garden and prepare in the kitchen and eat together. The Berkeley Public School system also sources all its cafeteria food from local farms which creates a wholistic approach to food at the school. <sup>9</sup>

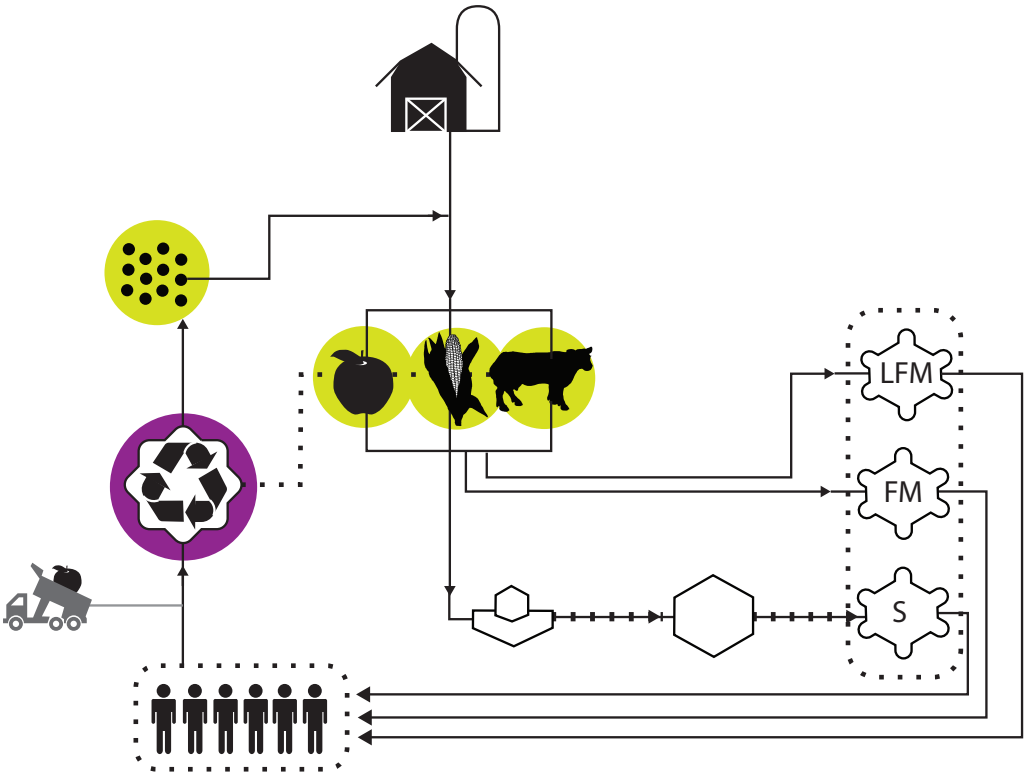


Edible Schoolyard, Berkeley CA. <sup>49-52</sup>

compost recycling programs

Create mandatory city or town wide composting programs in which food scraps, yard trimmings, and soiled paper products are collected from households and used to create organic compost:

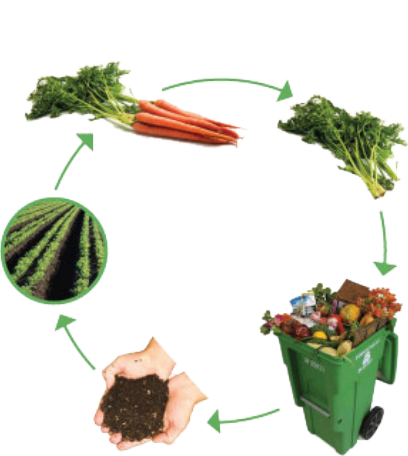
- Municipal recycling program of food and yard waste.
- Creation of organic compost to be used on local farms.
- Provide free distribution of compost to farmers.



san francisco's zero waste plan

Biodegradable materials such as paper products, food scraps, and yard trimmings contribute to almost half of our waste. When biodegradable materials are landfilled they decompose without oxygen and releases methane, a greenhouse gas more potent than carbon dioxide. Industrial farming methods such as pesticide use have been emitting greenhouse gases into the atmosphere for years and strip the soil of carbon and other essential nutrients. Instead of using organic compost to solve the problem industrial agriculture uses chemical fertilizers, which also releases greenhouse gas. By recycling food waste in a composting program, methane gas production in landfills is reduced and the waste can instead be turned into organic fertilizers, which will help reduce greenhouse gases on farms due to synthetic fertilizer use.<sup>10</sup>

San Francisco was the first city to adopt a large urban scale collection of food scraps. The city requires all households, businesses, and multi-tenant buildings to compost food scraps, soiled paper products (coffee filters, pizza boxes, milk cartons, paper napkins, etc.), and yard trimmings. The program collects 480 tons of food waste per day and converts them to compost, which is then sold to farmers who then sell it back to people in the form of produce.<sup>11</sup>



Composting yard, San Francisco, CA<sup>53</sup>



# benefits

“Food is all about networks; things that when connected together add up to more than the sum of their parts.”

Carolyn Steel \_ Hungry City \_ 324

As the system stimulators are inserted into our environment we will begin to see a number of benefits and improvements. By transforming the current industrial food system into a sustainable food system we will slowly begin to take the agricultural system off of its fossil fuel diet. Many critiques question whether sustainable systems can actually feed the world. And while we don't know for sure, there is nothing to say it couldn't produce comparable yields to the industrial food industry. Each stimulator will influence a number of benefits to society, the local food system, and the environment:

## land-grant universities

- Provide sustainable techniques and technologies to local farmers
- Provide the community with skilled farmers
- Inform local food policy centers on agroecology
- Promote healthy eating and organic food

## local food systems

- Use less oil in distribution of food
- Provide consumers with fresher food
- Provide affordable and healthy food to people of all income levels
- Creates less greenhouse gas during processing, packaging, and distributing

## community supported agriculture

- Connect farmers and consumers
- Provides opportunities for access to organic food
- Mutual support for farms and community members

## local food policy councils

- Ensure affordable organic food
- Raise awareness of implications of processed and fast food
- Advertise organic and healthy food
- Protect the community from food borne illnesses
- Distribute information among different organizations
- Ensure fair pay for farmers and farm-workers

## institutions

- Provide students/employees/visitors with locally sourced food
- Support local/regional farms/farmers
- Create a network of local farms and organizations
- Improve the health of students/employees/visitors/etc.

## elementary schools

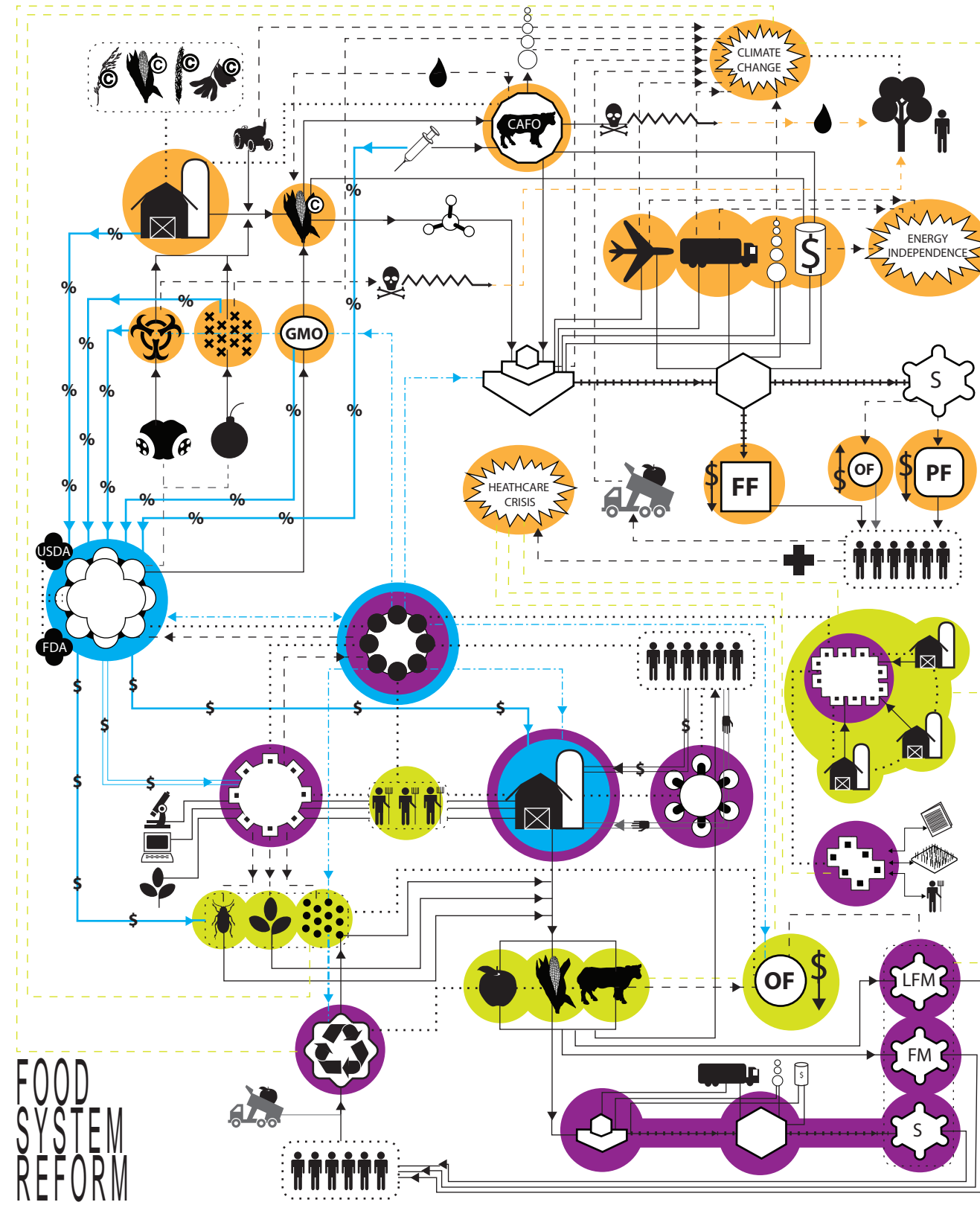
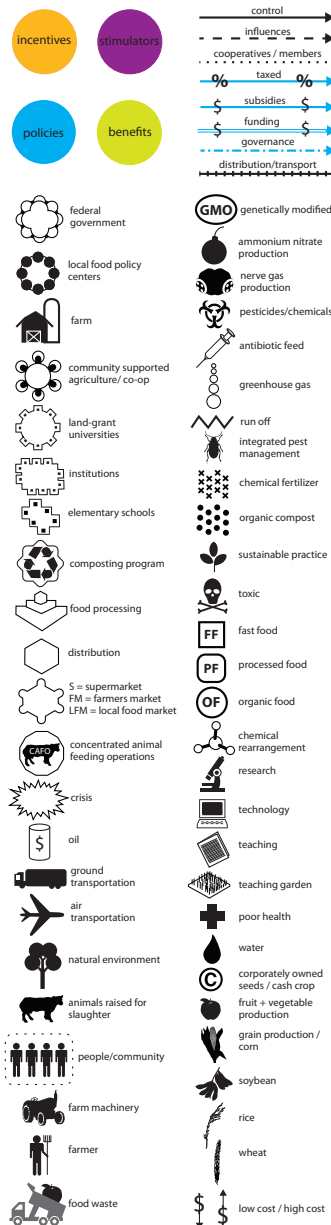
- Educate children from a young age about the benefits of healthy food and the consequences of processed and fast food
- Provide hands-on learning
- Provide healthy school lunches

## compost recycling center

- Decrease amount of food waste being disposed of in landfills
- Decrease greenhouse gas emissions
- Decrease/eliminate the use of synthetic fertilizers

When all the pieces of the puzzle connect we end up with a sustainable food system that benefits all of society. The map on the right displays the network each of the systems and programs at play in the food system reform. With this system in place we can stimulate change in our food environment.

## PICTOGRAPHIC GRAMMAR

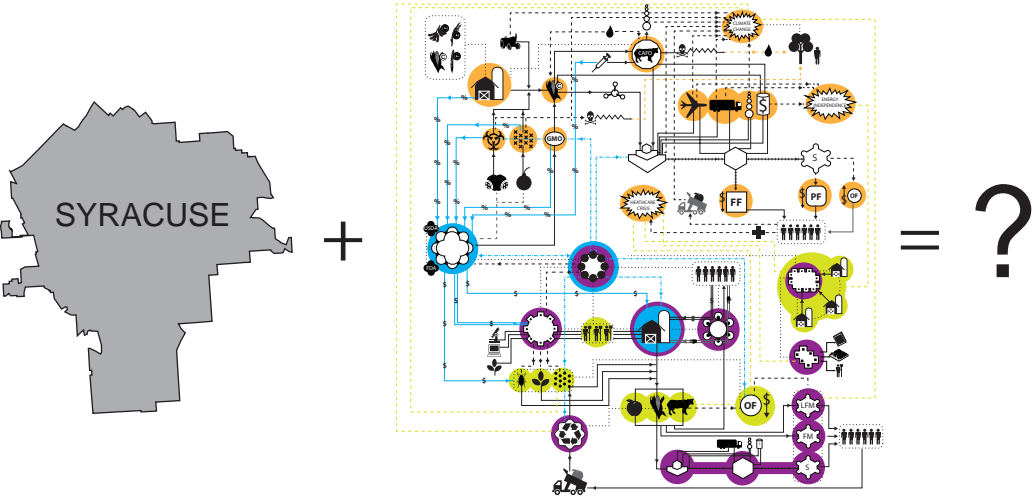


# case study

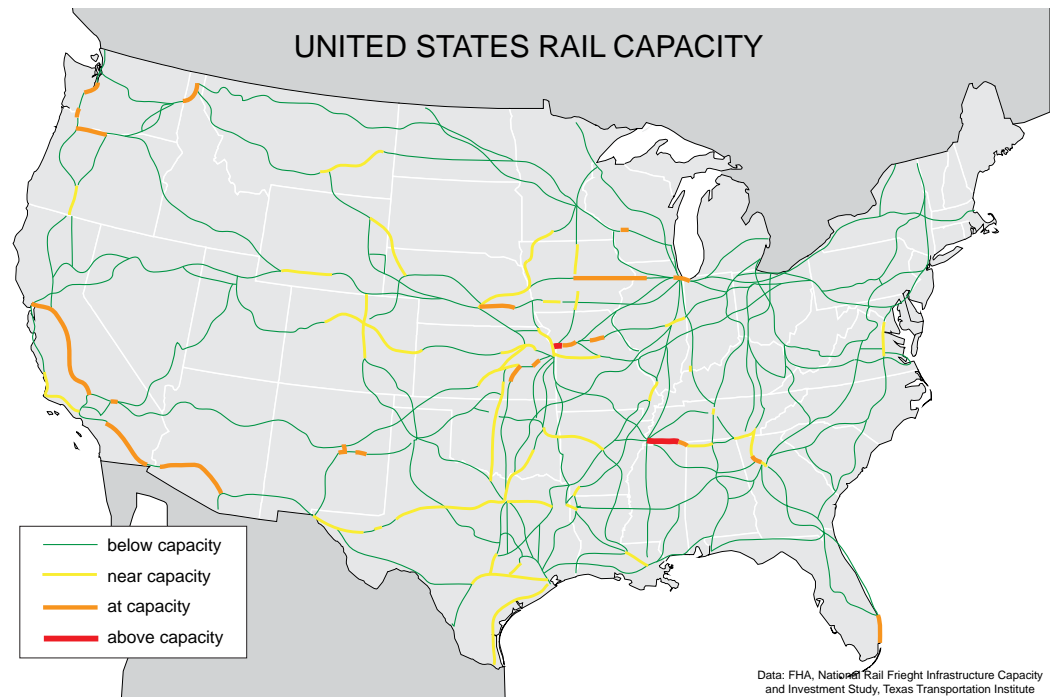
Reforming the food system is not simply an architectural response. One building will not make an impact on the entire system. It needs an integrated approach and planning scheme which looks to policies, planning, infrastructure, AND architecture to achieve a sustainable food system.

The design proposal begins by applying the Food System Reform Plan to the city and region of Syracuse as the site and program. Syracuse serves as a case study and was chosen based on the ability to conduct research easily as well as an example of a city with food desert issues. However this could be applied to any number of cities in the country as well.

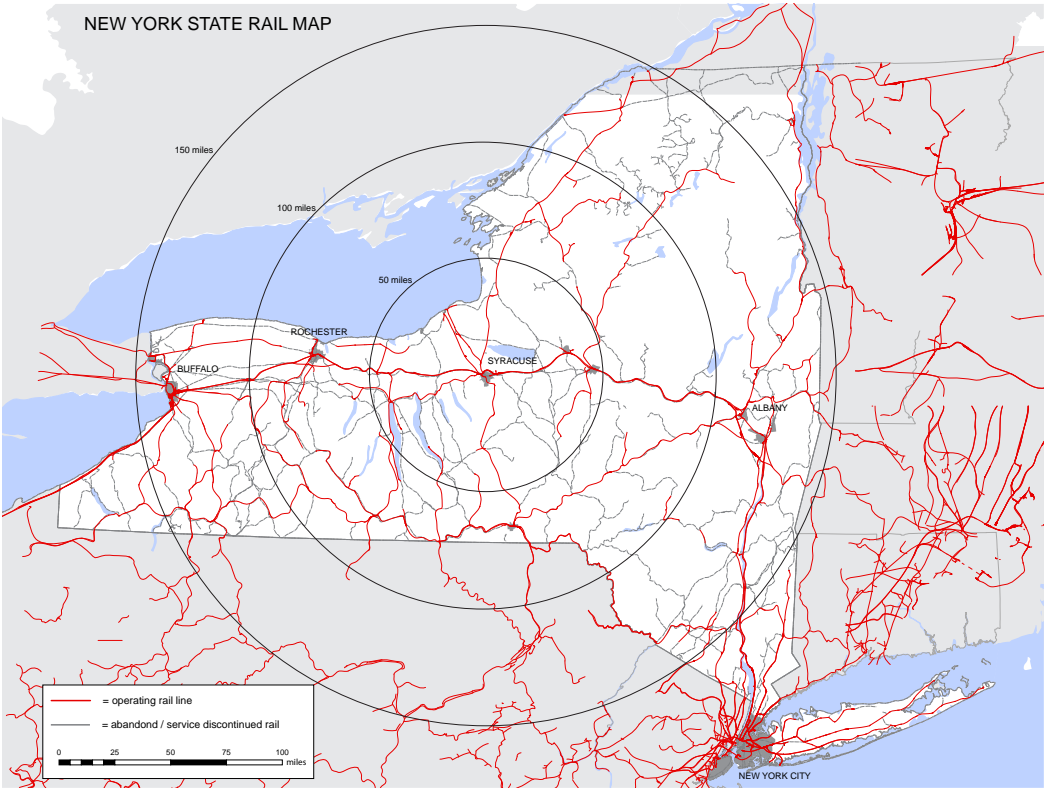
Through understanding the existing conditions of Syracuse it is clear that the major missing link is the distribution and aggregation of local products.



The existing under utilized railway network provides an infrastructure with which to facilitate the movement of local food. Trains can carry the load of 280 or more trucks.

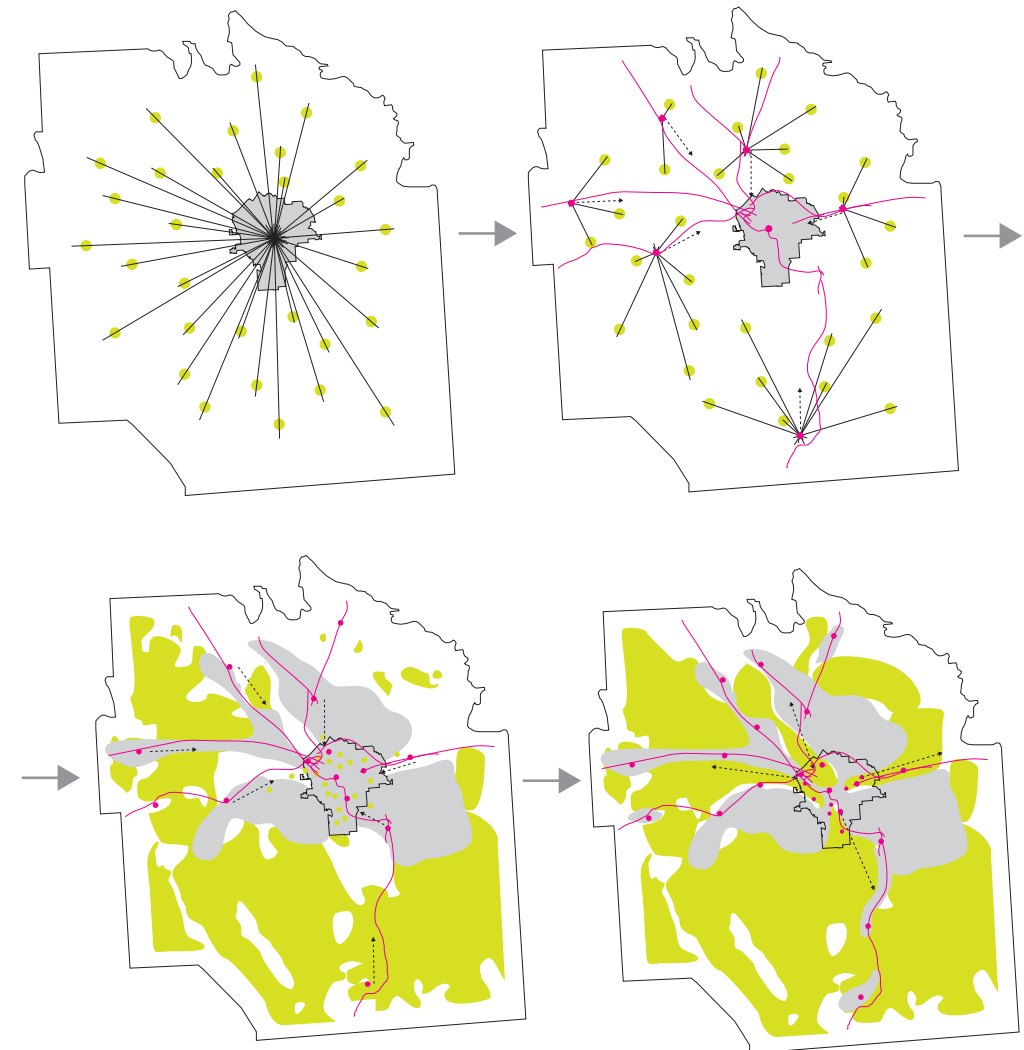


Through the re-use of the rail, the re-zoning of Syracuse, and the introduction of Food hubs throughout the county a local food system can occur. This project spans 20 years and has been conceived of as a phased plan which would not only support a local food system but would create “green jobs” and generate a local economy. The project engages with the food system along 4 scales, the county (Onondaga County), the city (City of Syracuse), the site (multiple food hubs through both the county and city), the kit of parts (pieces of program and systems in the food hubs)



# county

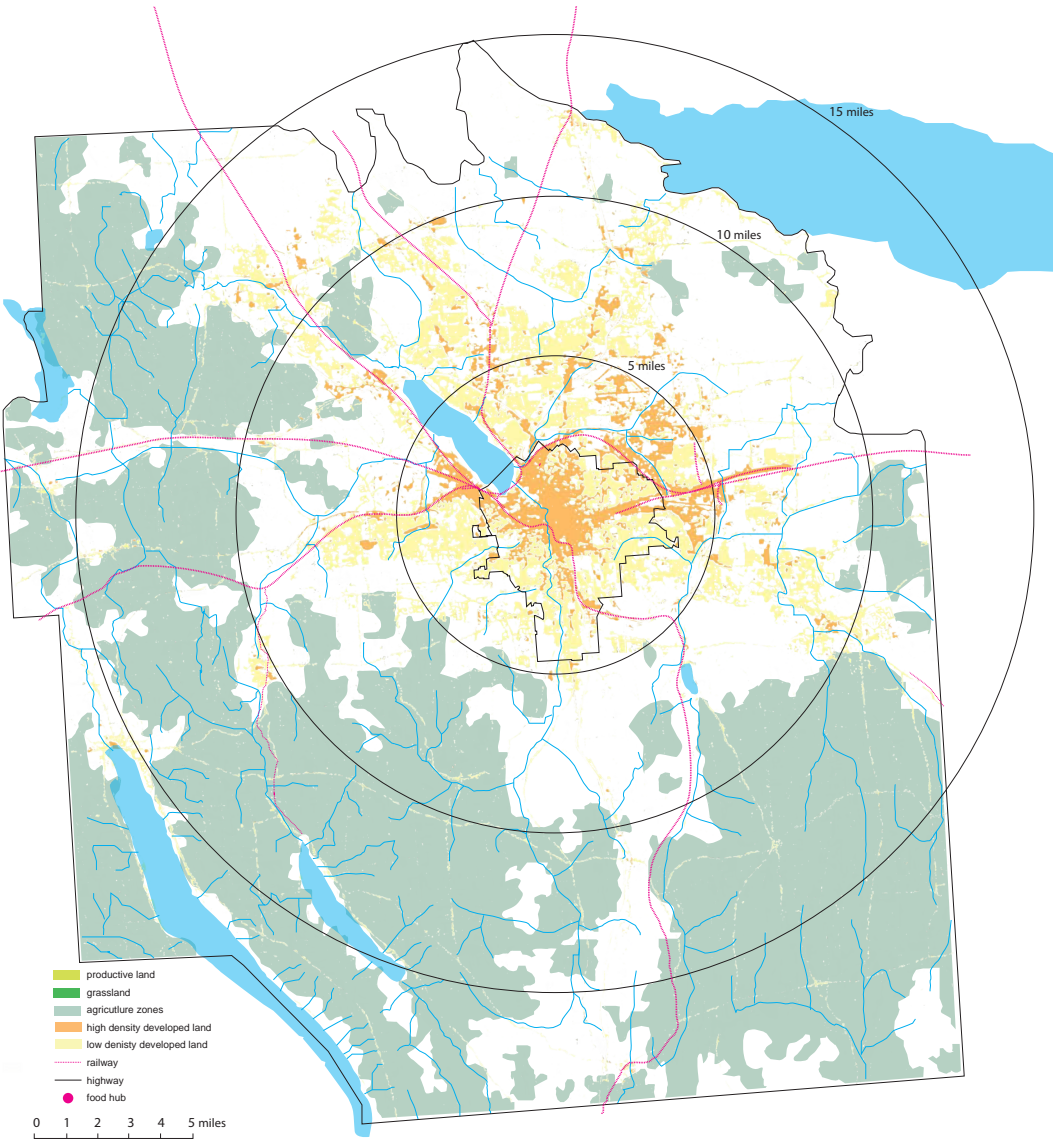
Currently distribution by local small farms is done through a farm by farm basis where each farm delivers individually to a given location. Through the creation of “FOOD HUBS” along this existing network of rail we can begin to aggregate products from local farms and facilitate their distribution to markets and consumers in the city.





YEAR 0:

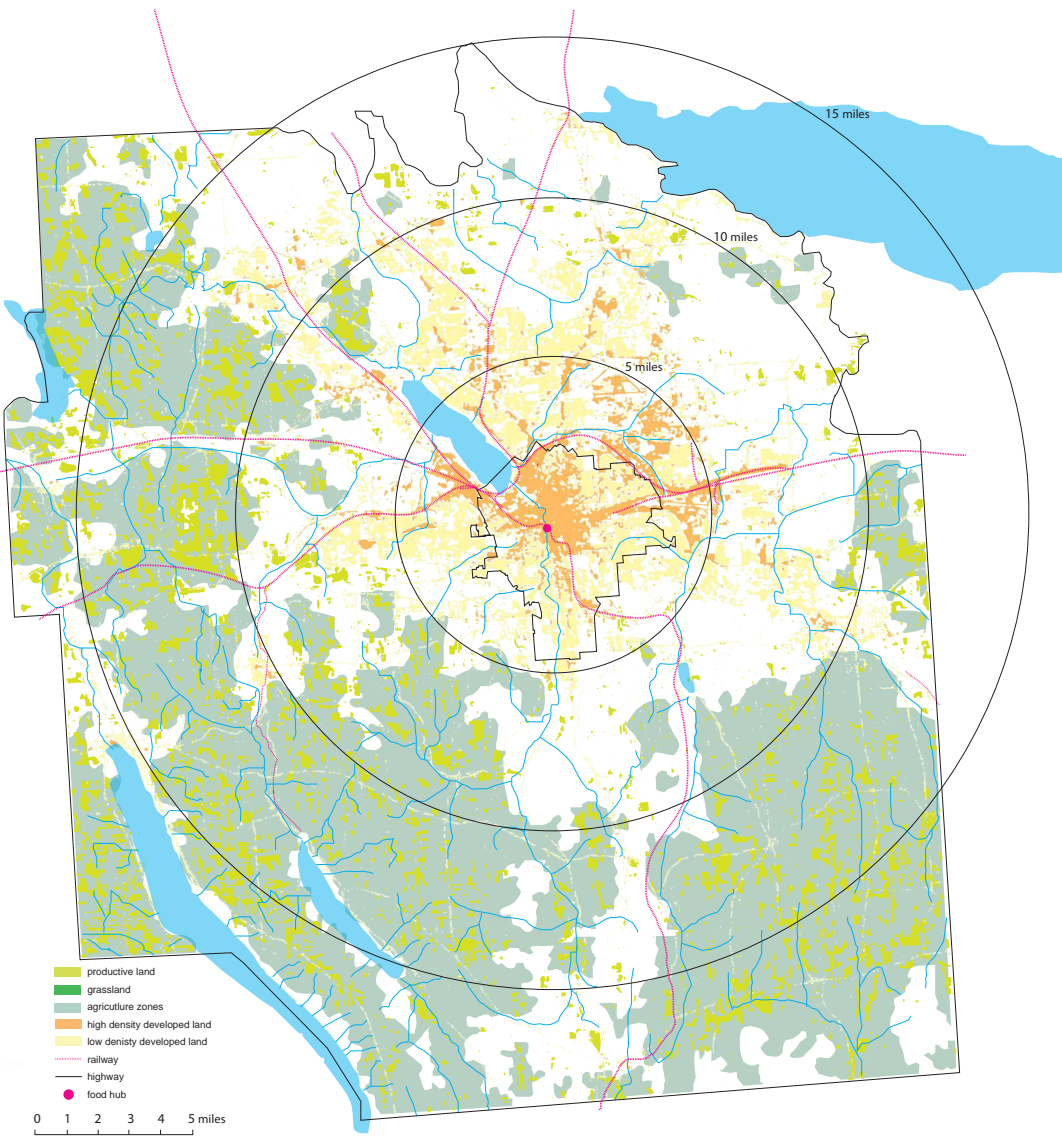
existing land cover of  
Onondaga County



**YEAR 1:**

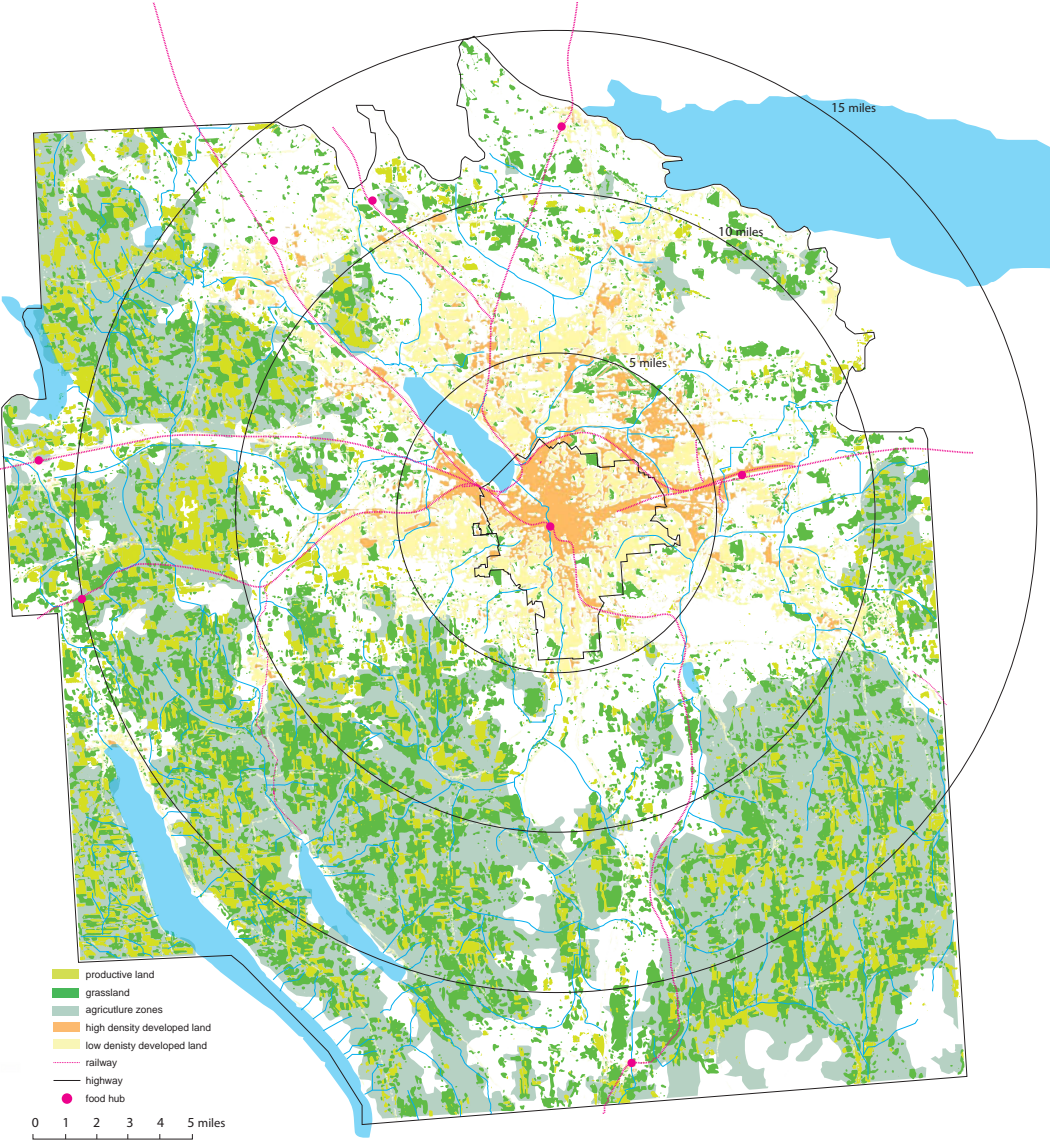
**central urban hub +  
cultivated land**

As the infrastructure is put in place to facilitate distribution - production can increase.  
The first HUB is central and provides the initial outlet point.



**YEARS 1-3:      rural hubs + increased production  
                         on open grassland**

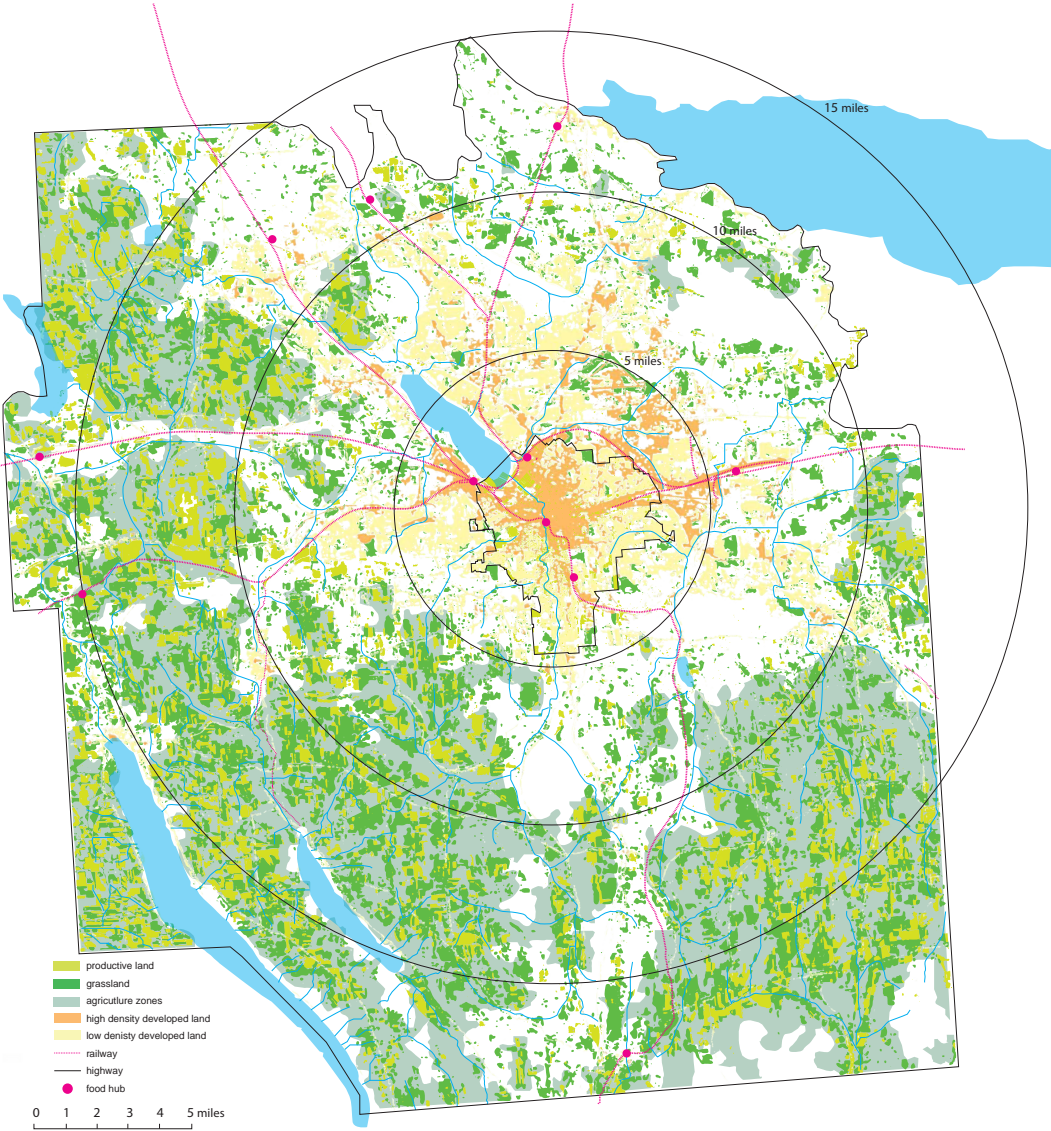
Rural Hubs are established and provides the necessary facilities for aggregation and distribution. Potential for increased production on open grassland.





**YEARS 3-5:**      **city edge hub + vacant city land**  
**utilized for urban farming**

City Edge Hubs are established and create further aggregation / distribution points.  
Vacant city land becomes utilized for urban farming.



**YEARS 5-10:** neighborhood hubs + grassland is cultivated

Neighborhood hubs emerge as vacant land in the city becomes available for food production. These are non railway hubs but are located based on available resources in the city. Open Grassland becomes cultivated and a connection between rural production and urban production emerges.





**YEARS 10-20:**                      **interstitial hubs + urban**  
**and rural land blurred**

Interstitial hubs develop due to activity of the railway and the lines between rural production and urban production are blurred as a continuous productive landscape is created.



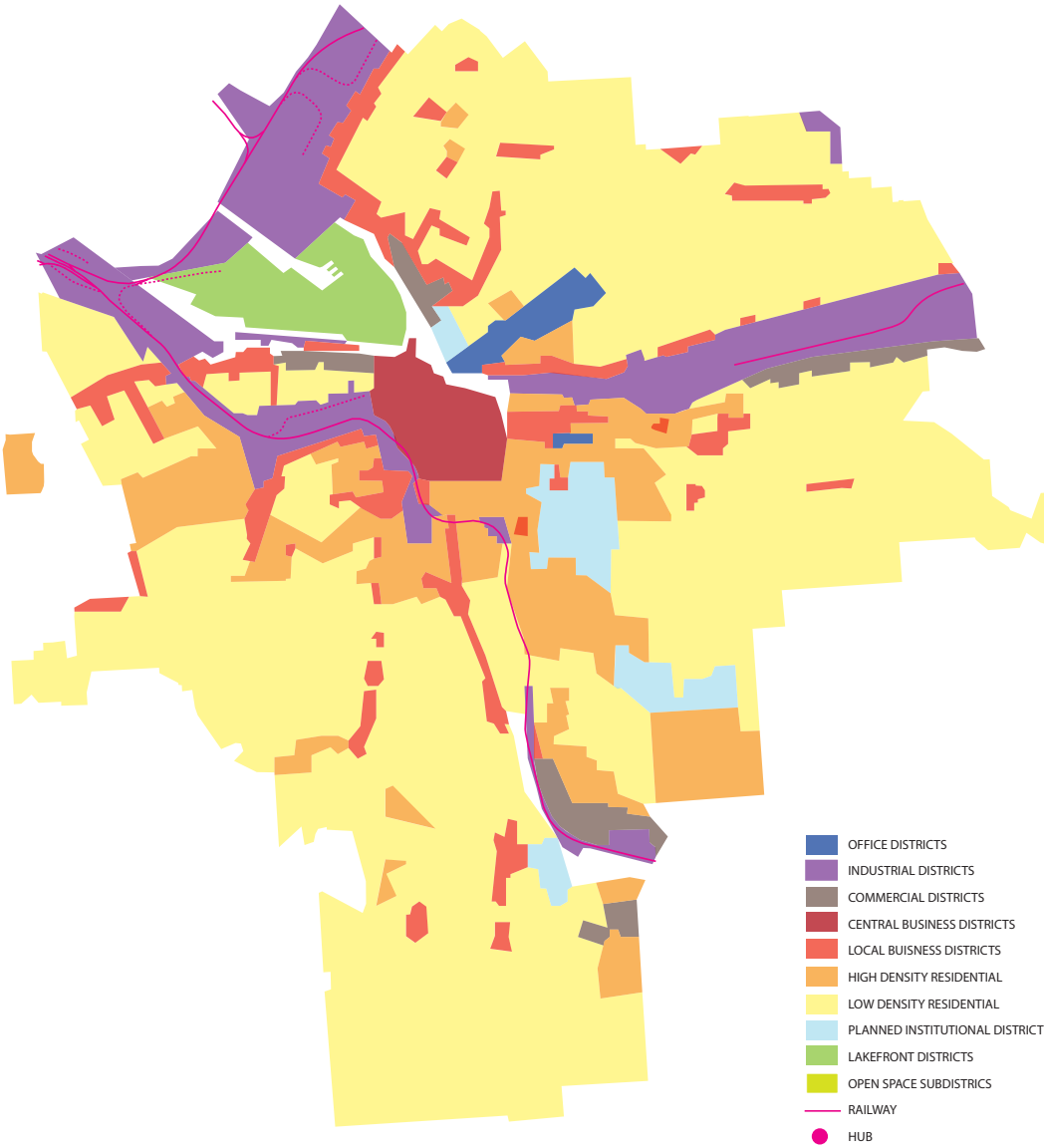
# city

Within the city zoning laws and regulations have a large impact on what gets built where. A re-structuring of zoning laws will allow for urban agriculture uses to become legitimate uses within the city code. Many cities such as Seattle, Boston, Portland, and Cleveland have begun to address urban agriculture in their zoning regulations.

**YEAR 0:**

**existing zoning codes**

The current zoning regulations do not include any restriction to urban farming but they also do not include any agricultural uses or even community gardens as a “permitted use”.



**YEAR 1:**

**new permitted uses to  
existing zoning code**

Through introducing new permitted uses into the current zoning regulations things such as composting centers, food distribution centers, community gardens, urban farming, and farmers markets can become “permitted uses within different zoning codes”

See appendix for complete description of permitted uses.



**Farmers Market** – an outdoor or indoor market open to the public, operated by a governmental agency, nonprofit corporation, or one or more Producers, at which at least 75 percent of the products sold are local farm products or value added farm products  
Permitted use in the following zoning districts: all.



**Community Garden** – an area of land managed and maintained by a group of individuals and used for the cultivation of fruits, vegetables, plants, flowers, or herbs.  
Permitted use in the following zoning districts: all.



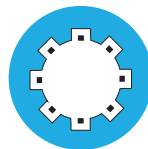
**Urban Farm** – an area of land within the city limits managed and maintained by the city or an non-profit organization, or a group of producers and used for the cultivation of fruits, vegetables, plants, flowers, or herbs for sale or distribution to local institutions.  
Permitted use in the following zoning districts: all.



**Packing House** – a building used to facilitate the processing, aggregation, and distribution of local produce to serve the local community, markets, and institutions.  
Permitted use in the following zoning districts: industrial districts, local business districts, and urban agriculture districts.



**Composting Center** – land and building facilities used to facilitate the collection, processing, composting, curing and packaging of food waste, yard waste, and spoiled papers collected from city residents and businesses and institutions.  
Permitted use in the following zoning districts: industrial districts and urban agriculture districts.



**Farming Training Facility** – land and building facilities used to teach and train local residents on urban farming techniques and processes, greenhouse construction, eating habits, and cooking.  
Permitted use in the following zoning districts: all.



**YEARS 1-3:**

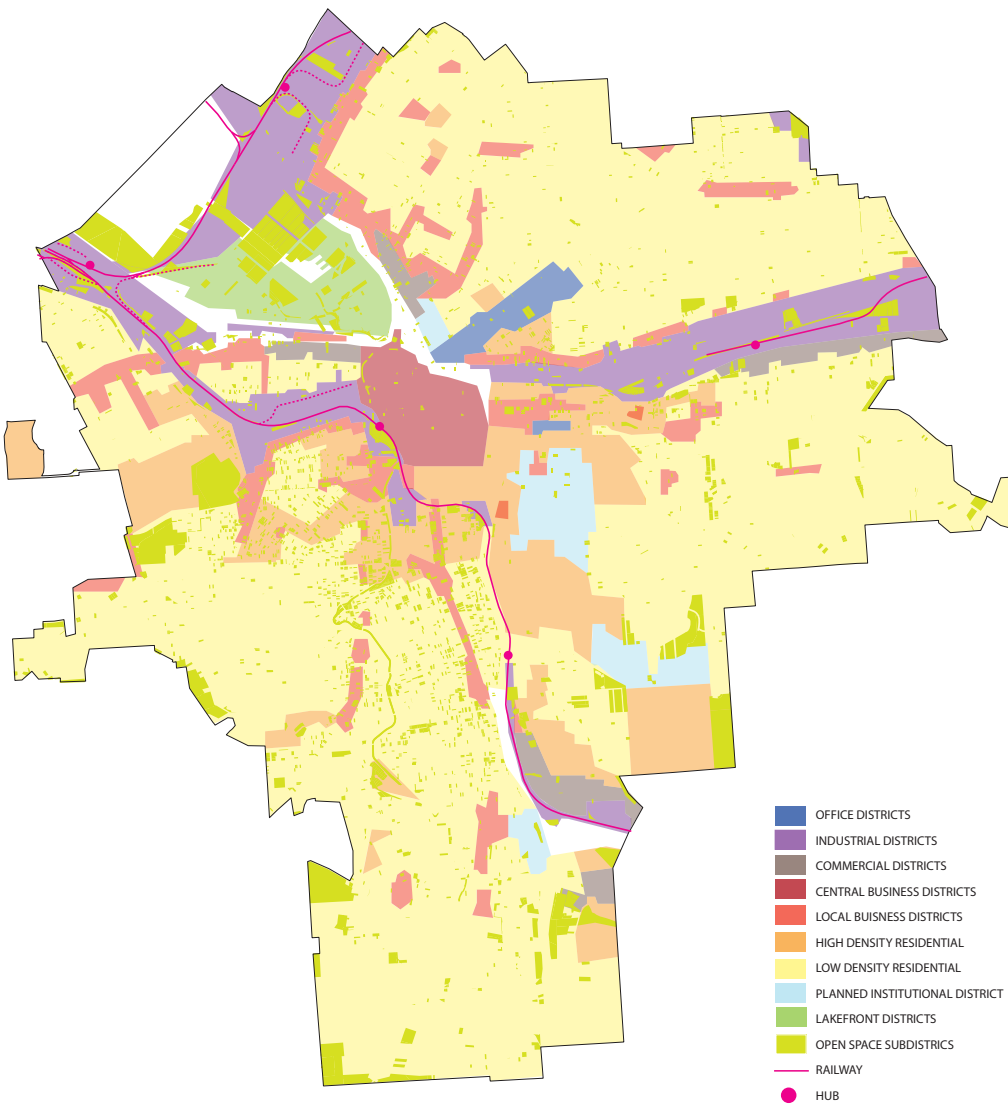
**“open space” subdistricts**

Creating a sub district for “open space” to allow for the re-zoning or re-purposing of vacant land within the city.

Open Space Subdistricts consist of vacant land, which becomes repurposed into community gardens, urban farms, or farmers markets. Vacant buildings may also enter into the Open Space Subdistrict. The land in the open space subdistrict is to be held open to the public and provided as an added amenity in the surrounding neighborhoods.

**Permitted Uses:**

- 1. Community Gardens
- 2. Urban Farms
- 3. Farmers Market
- 4. School/farming training facility



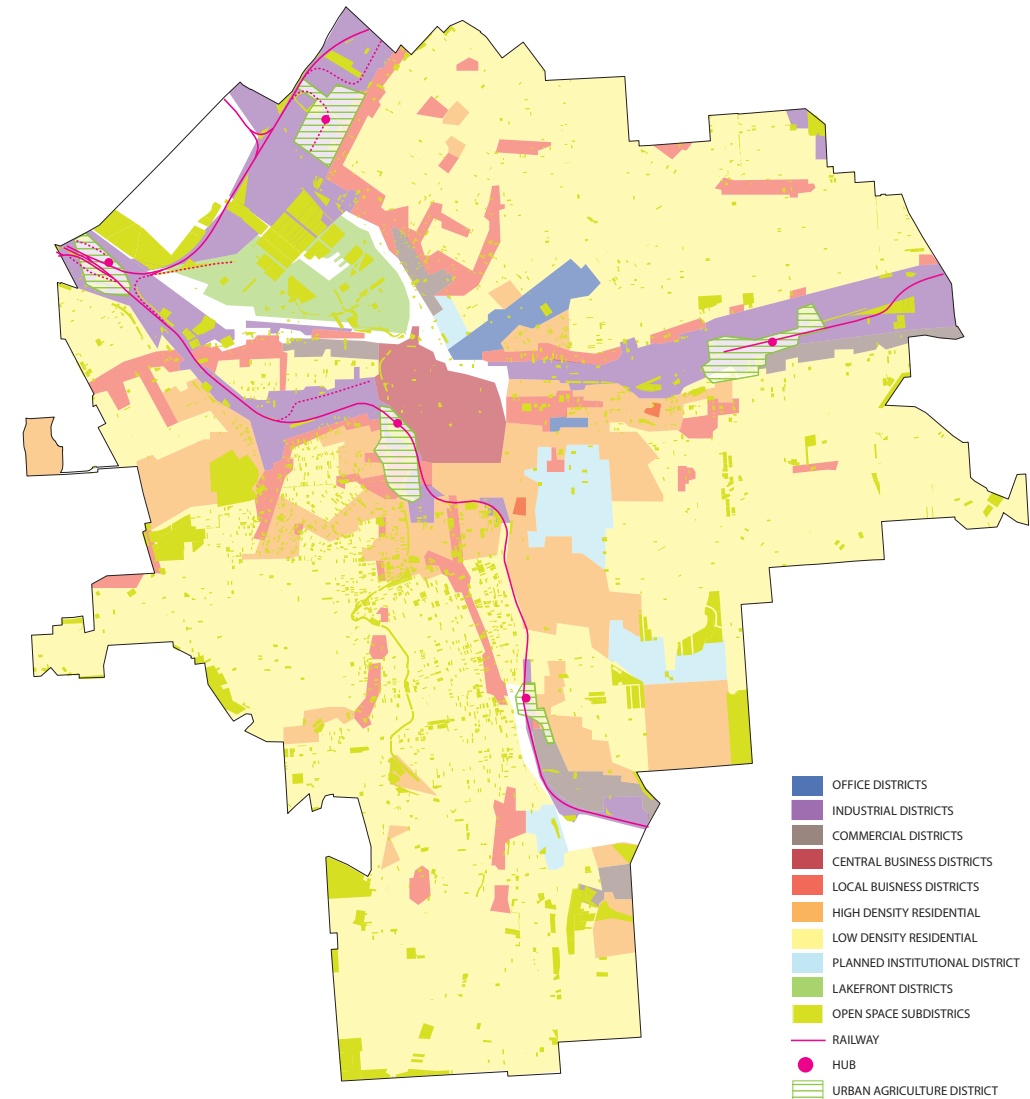
**YEARS 3-5:** urban agriculture districts  
surround food hubs

*Urban Agriculture Districts* are created as their own zoning code around food hubs, allowing the many programs associated with the sustainable food system to exist.

The *Urban Agriculture District* is established to ensure that urban agriculture uses are appropriately located and protected to meet the needs of local food production, community health, community education, urban and rural farmer and job training, environmental enhancement, preservation of open space, and community enjoyment. Any development within the *Urban Agriculture District* must be sustainable and supportive to the local food system.

### Permitted Uses:

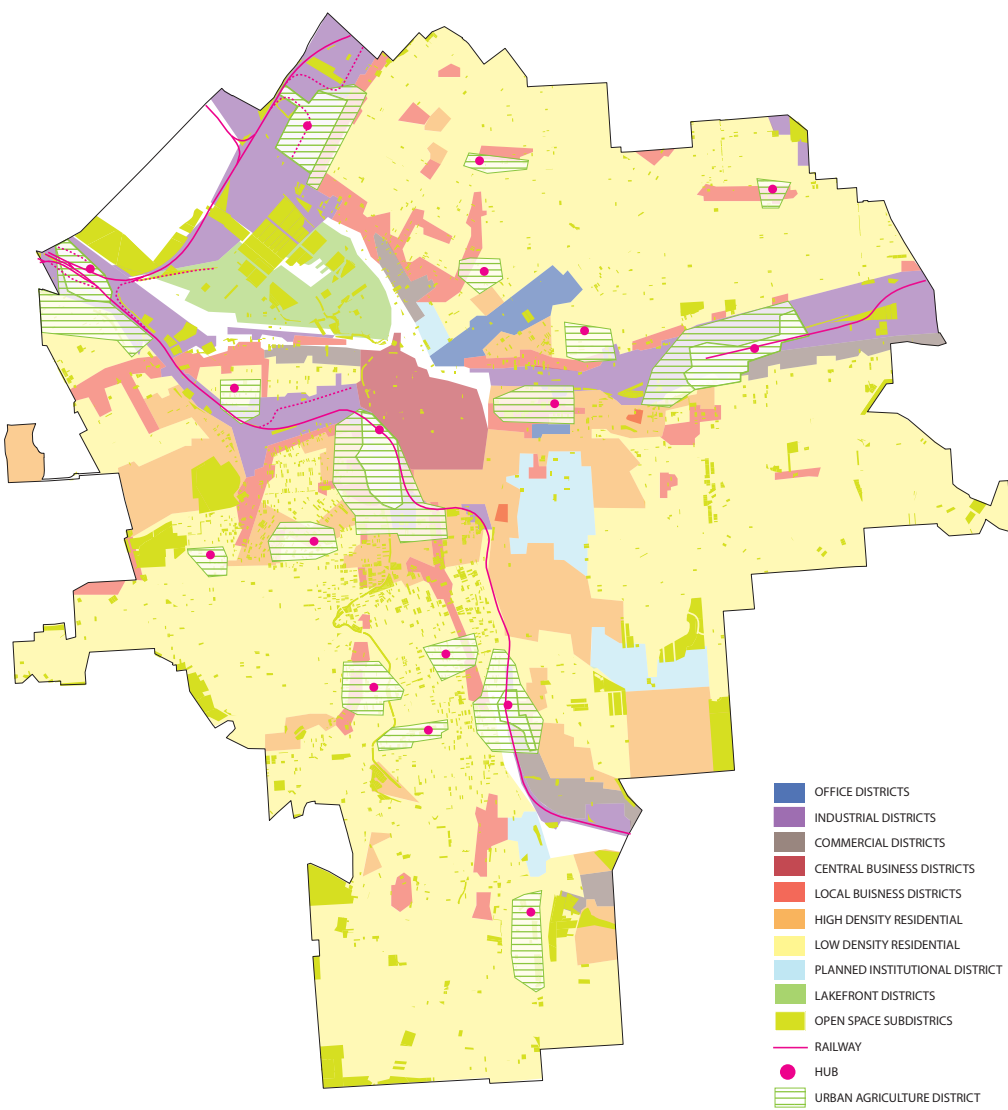
1. Community Gardens
2. Urban Farms
3. Farmers Market
4. School/farming training facility
5. Composting Center
6. Packing House
7. Transportation Centers
8. Residential uses
9. Small Businesses
10. Green Industries
11. Public Parks and Recreation Spaces



YEARS 5-10:

urban agriculture  
districts expand

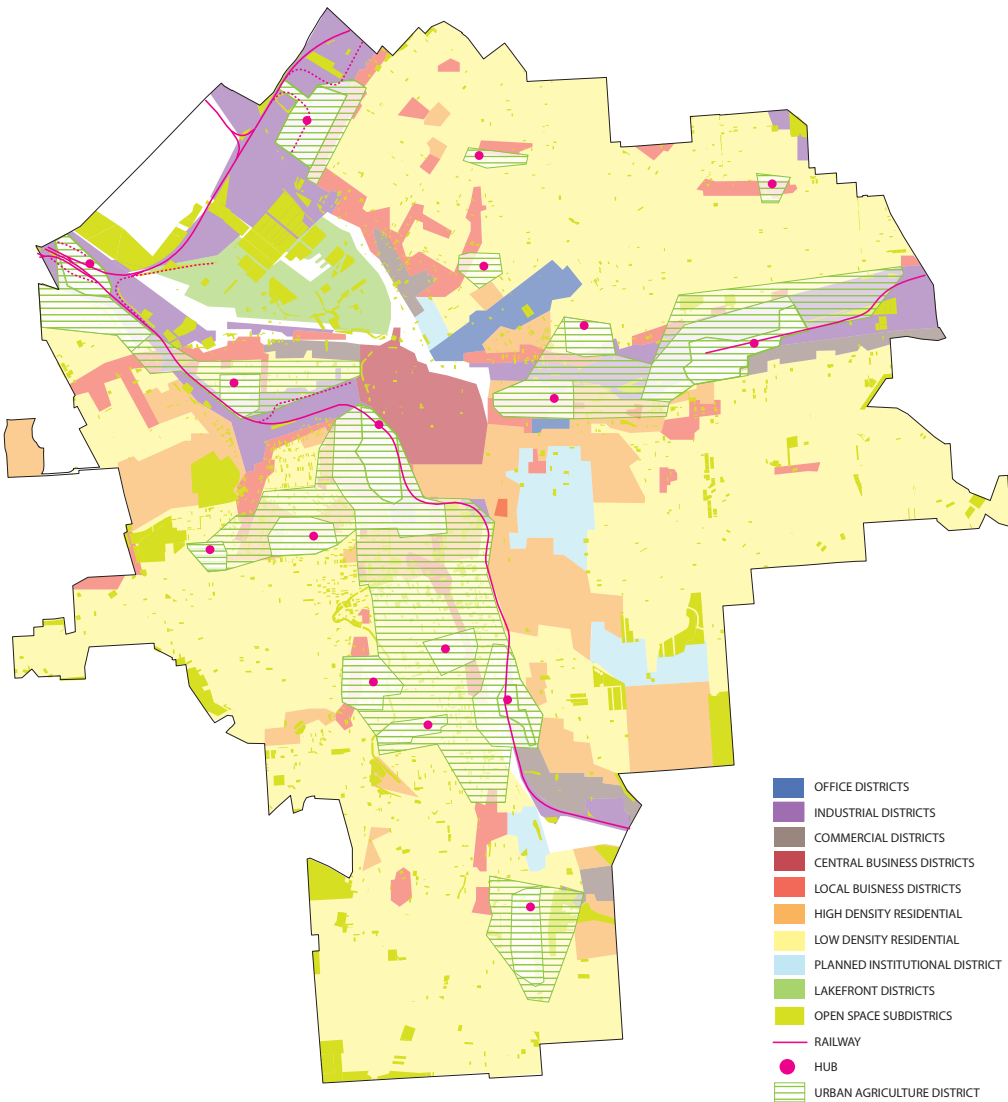
As neighborhood hubs are introduced new *urban agriculture districts* are created as and existing *urban agriculture districts* expand.



**YEARS 10-20:**

**urban agriculture  
districts expand**

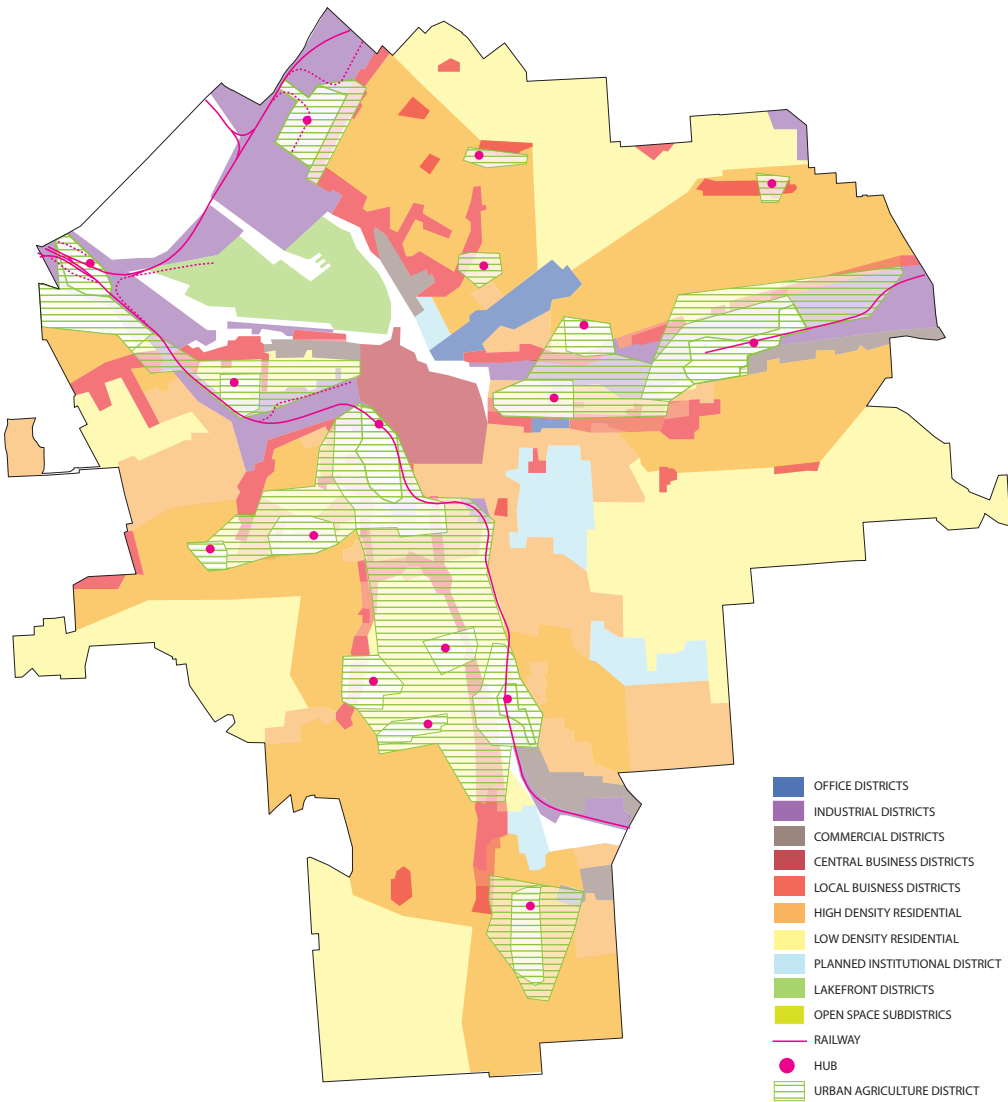
*Urban agriculture districts continue to expand. The districts absorb existing zoning regulations and the urban agriculture districts become a hybrid zoning district.*





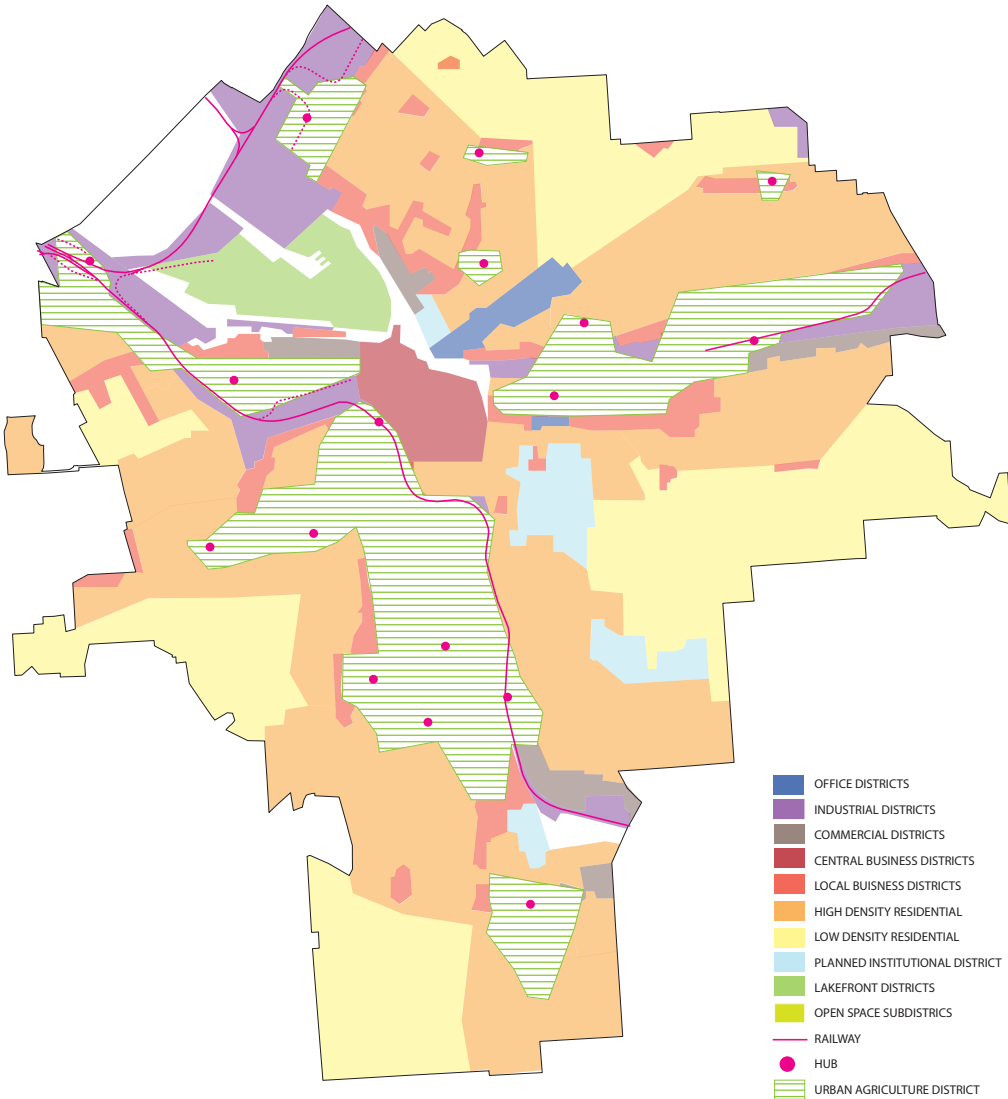
**YEARS 10-20:                    zoning districts restructure  
   around urban agriculture districts**

Other zoning districts surrounding *urban agriculture districts* are restructured and higher density residential areas surround new *urban agricultural districts*.



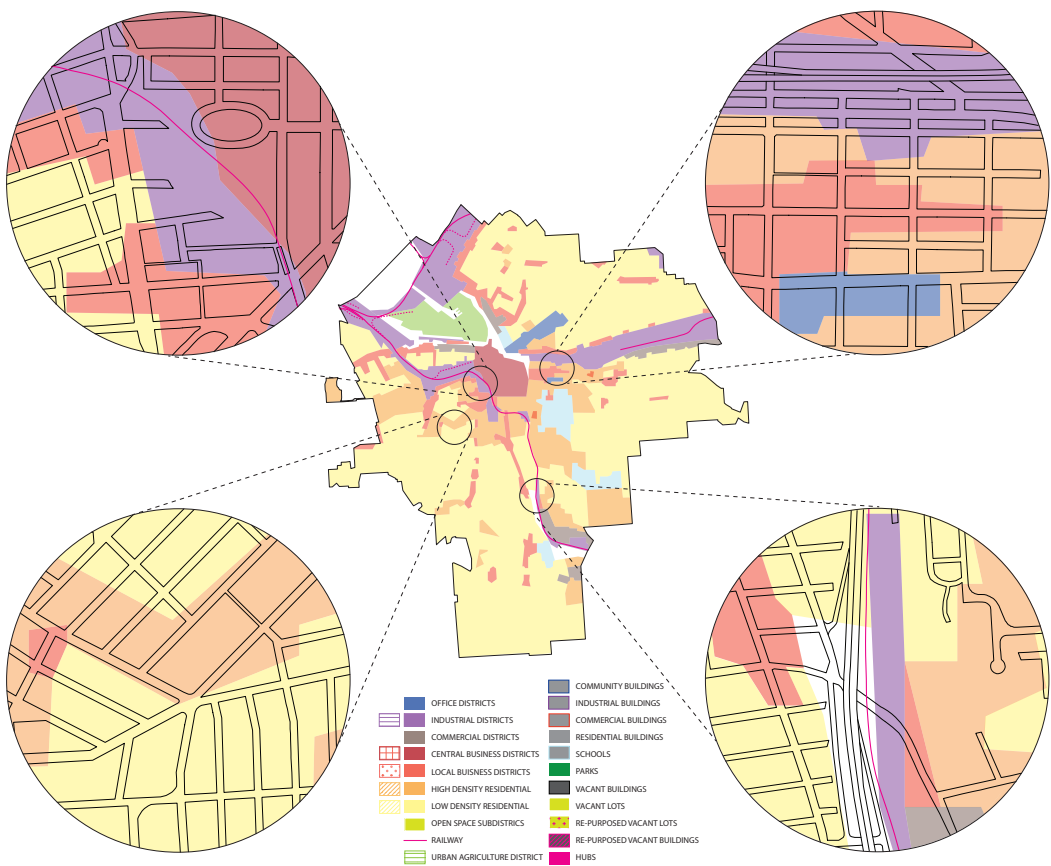
YEARS 10-20:

new zoning map



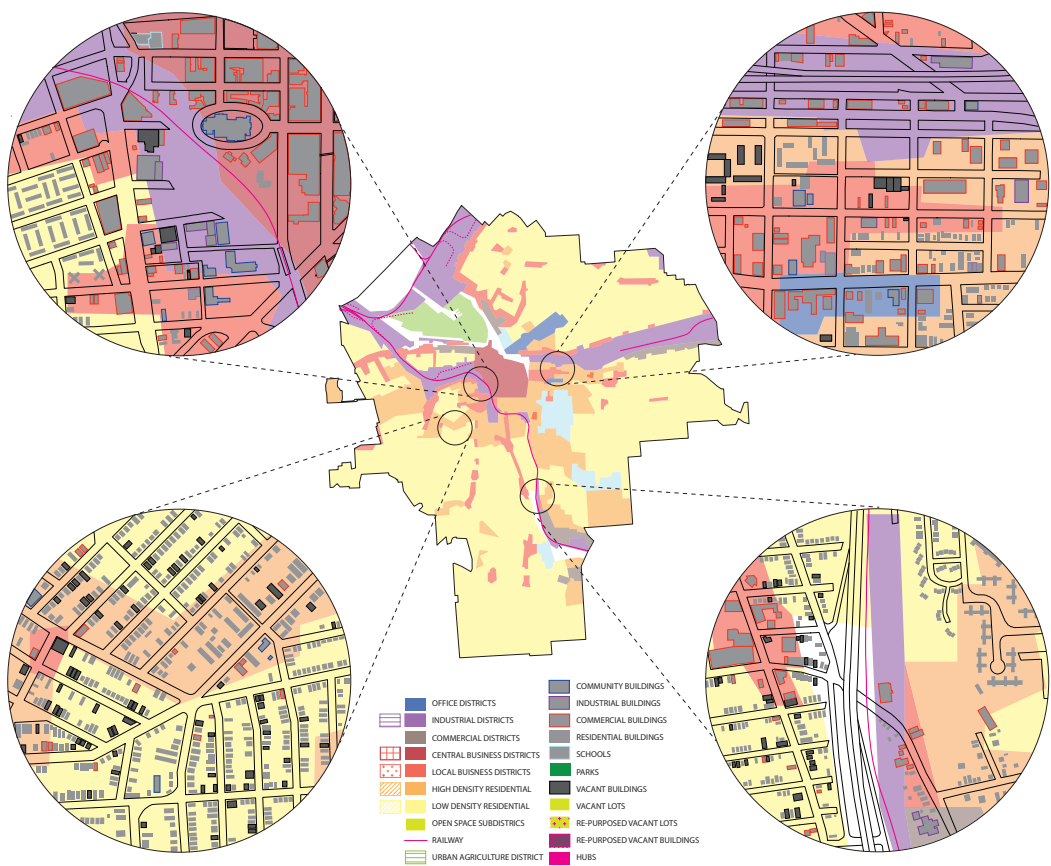
YEAR 0:

existing zoning codes

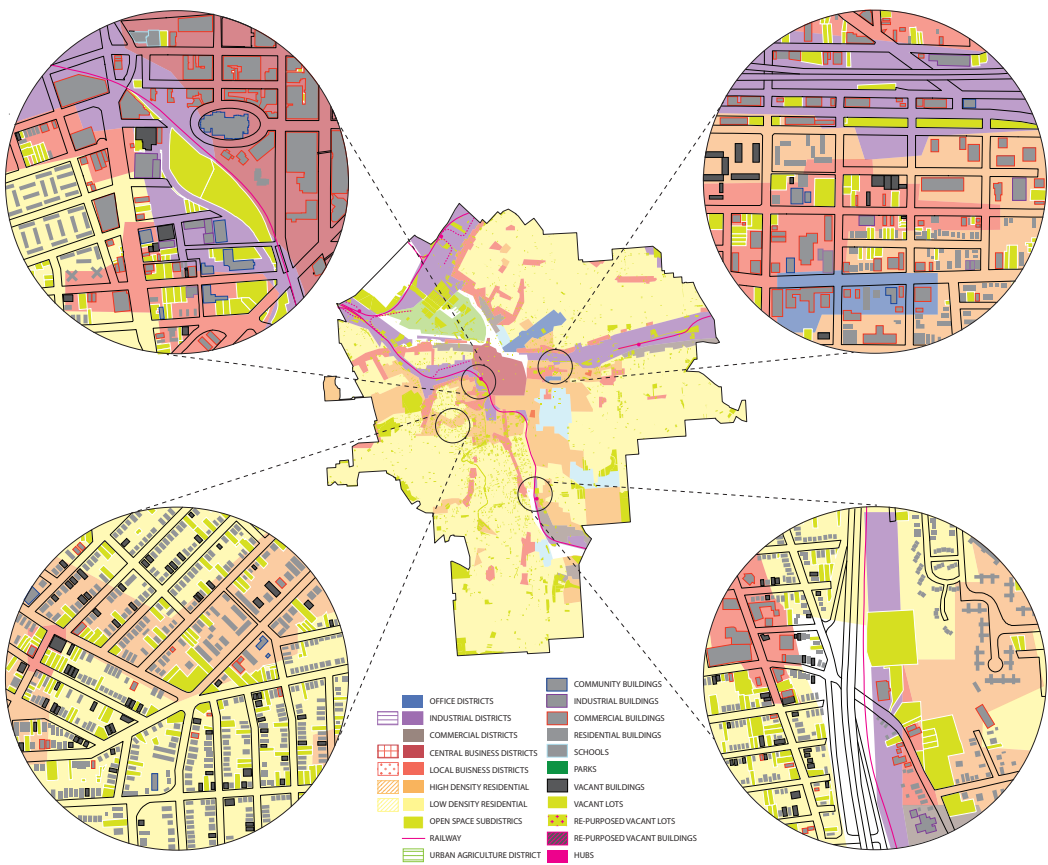


YEAR 0:

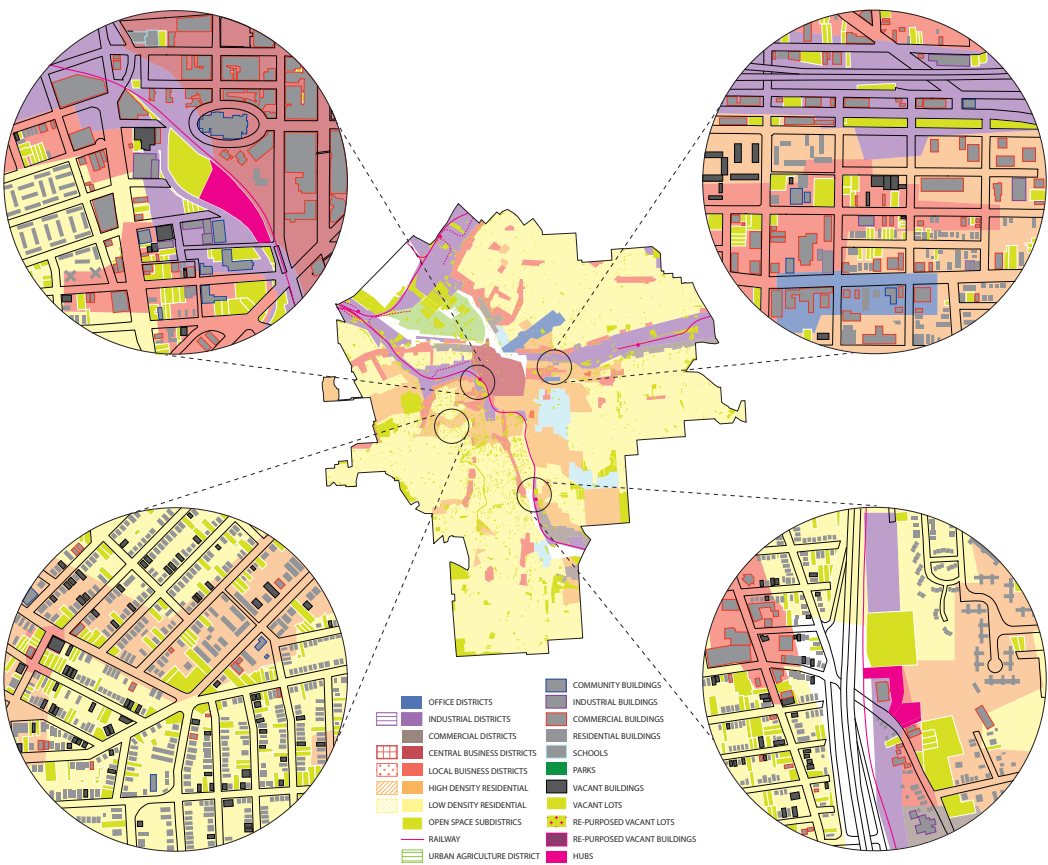
existing building program



YEAR 1:  
“open space” subdistricts  
+ existing buildings

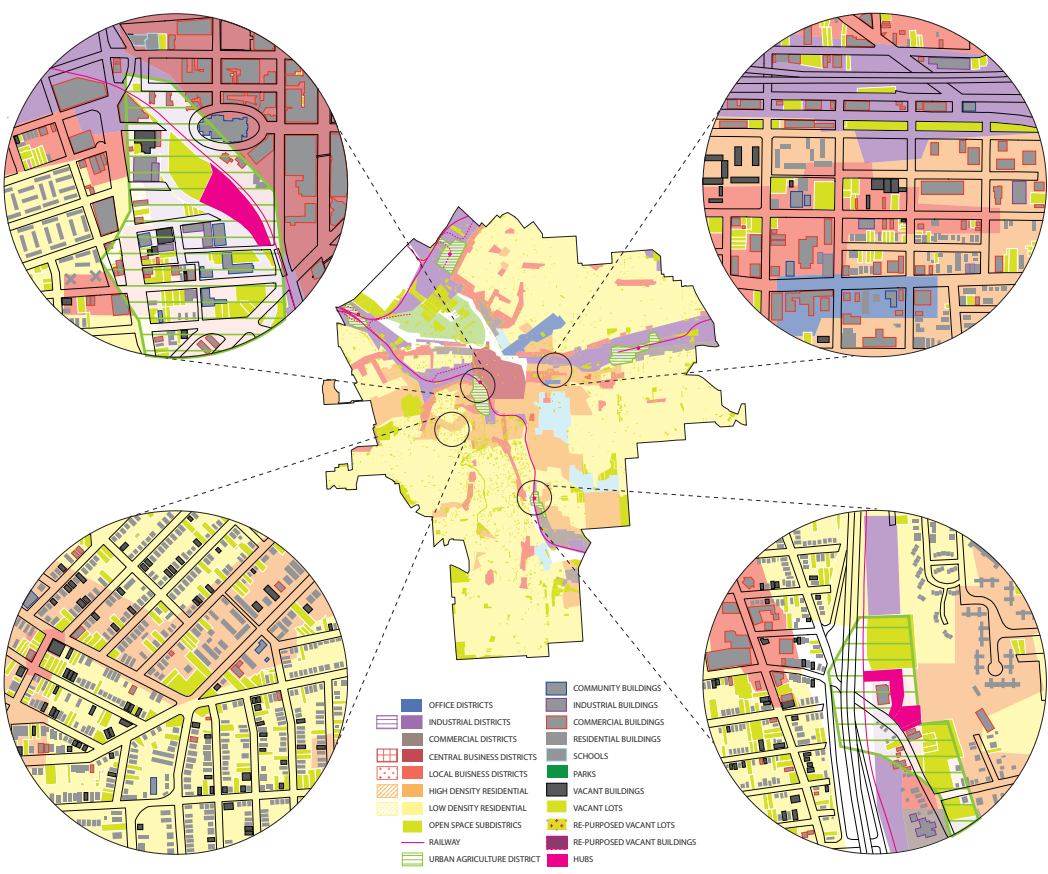


YEARS 1-3:  
city food hubs established  
on vacant land

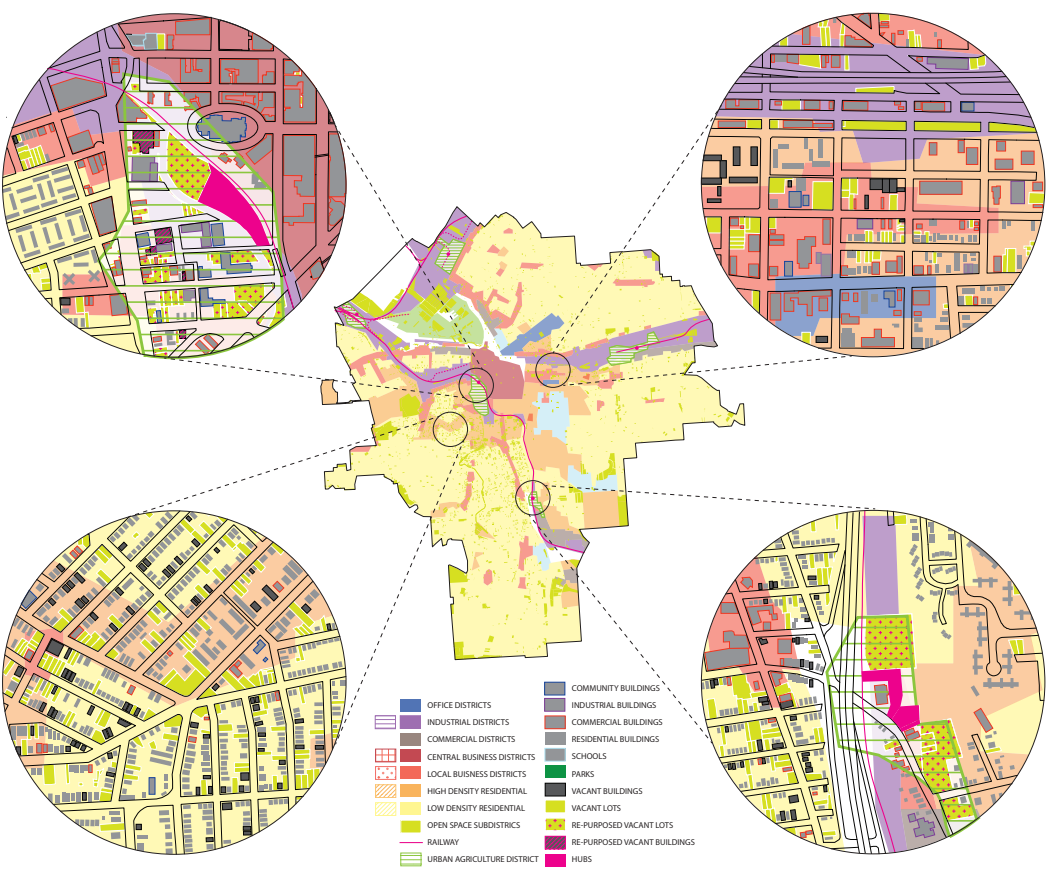




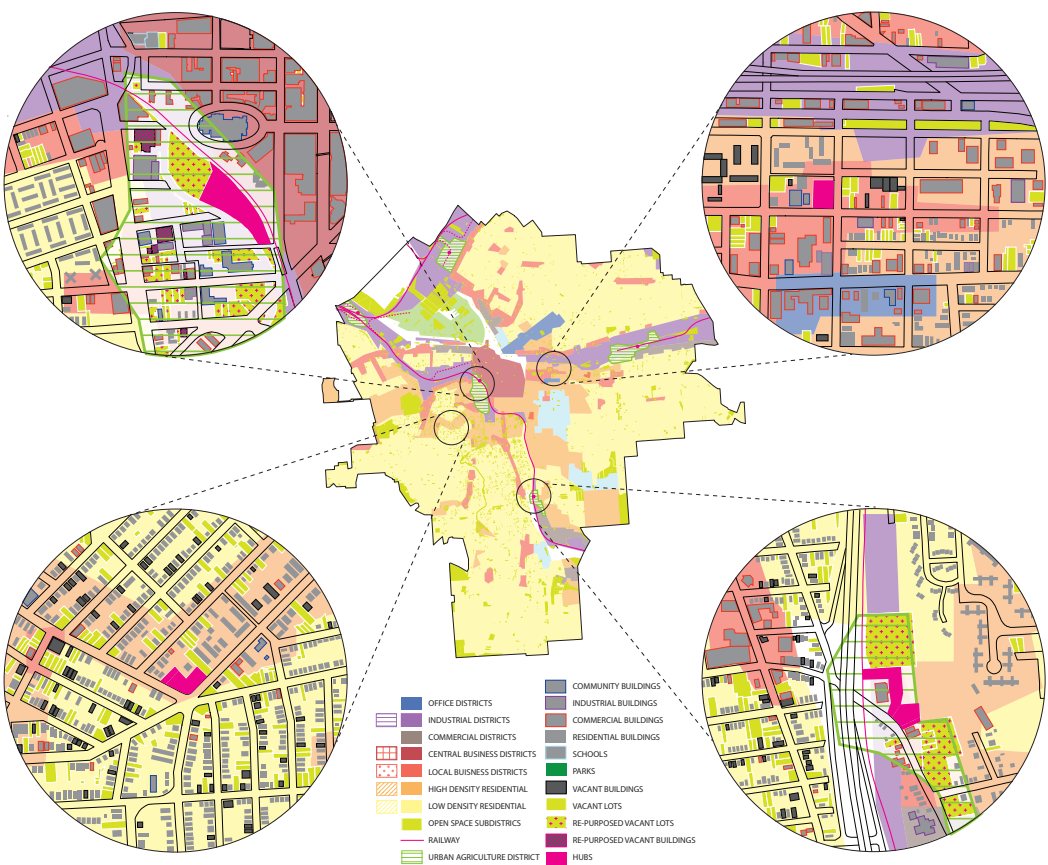
YEARS 3-5:  
urban agriculture districts  
form around food hubs



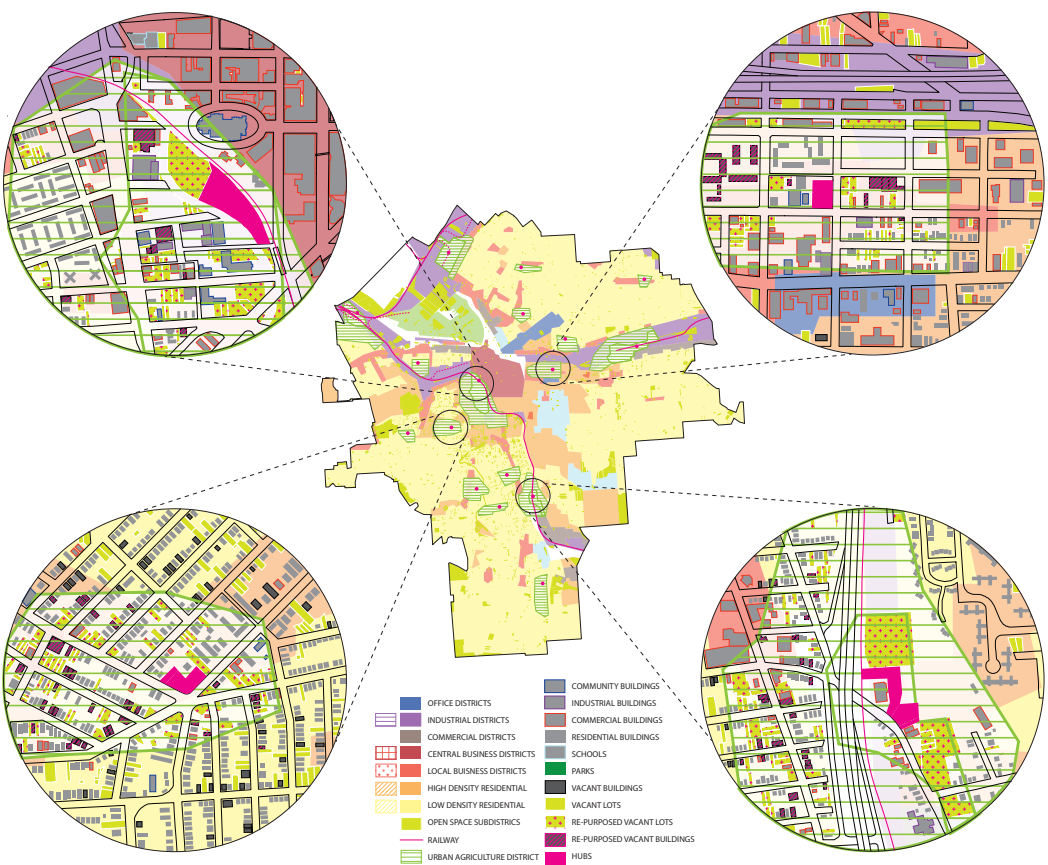
YEARS 3-5:  
vacant land within urban  
agriculture districts is re-purposed



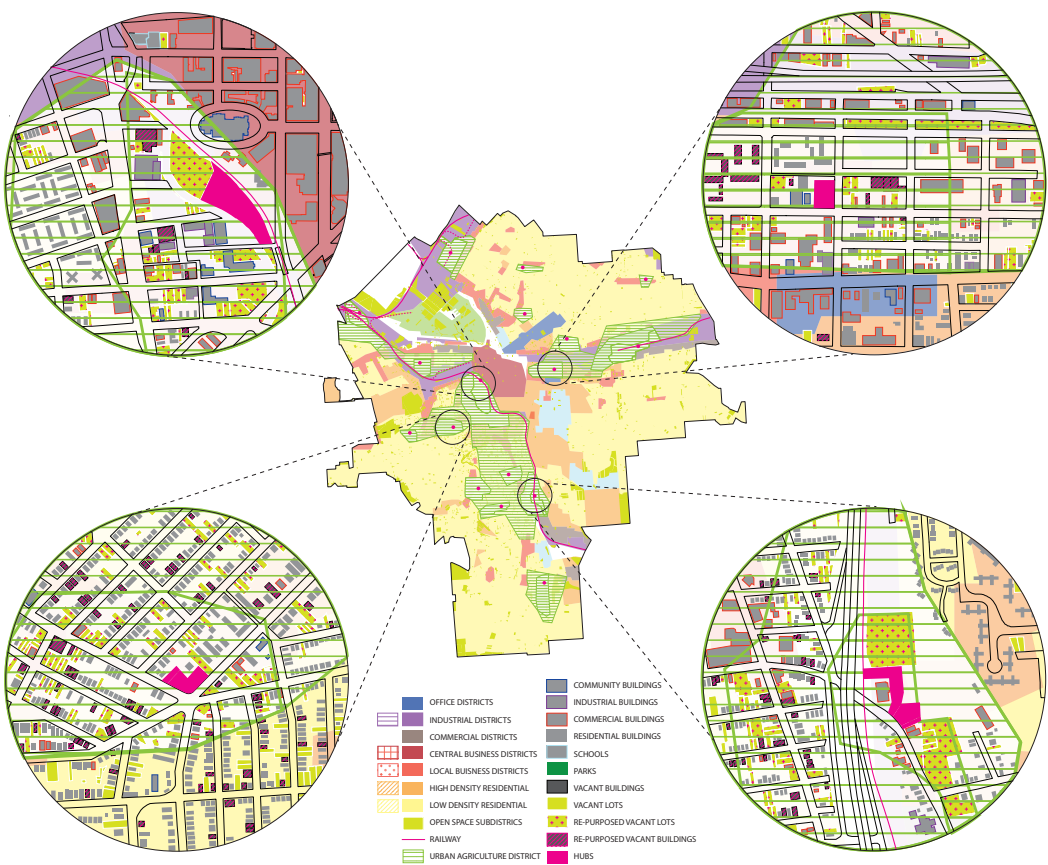
YEARS 3-5:  
neighborhood food hubs  
established on vacant land



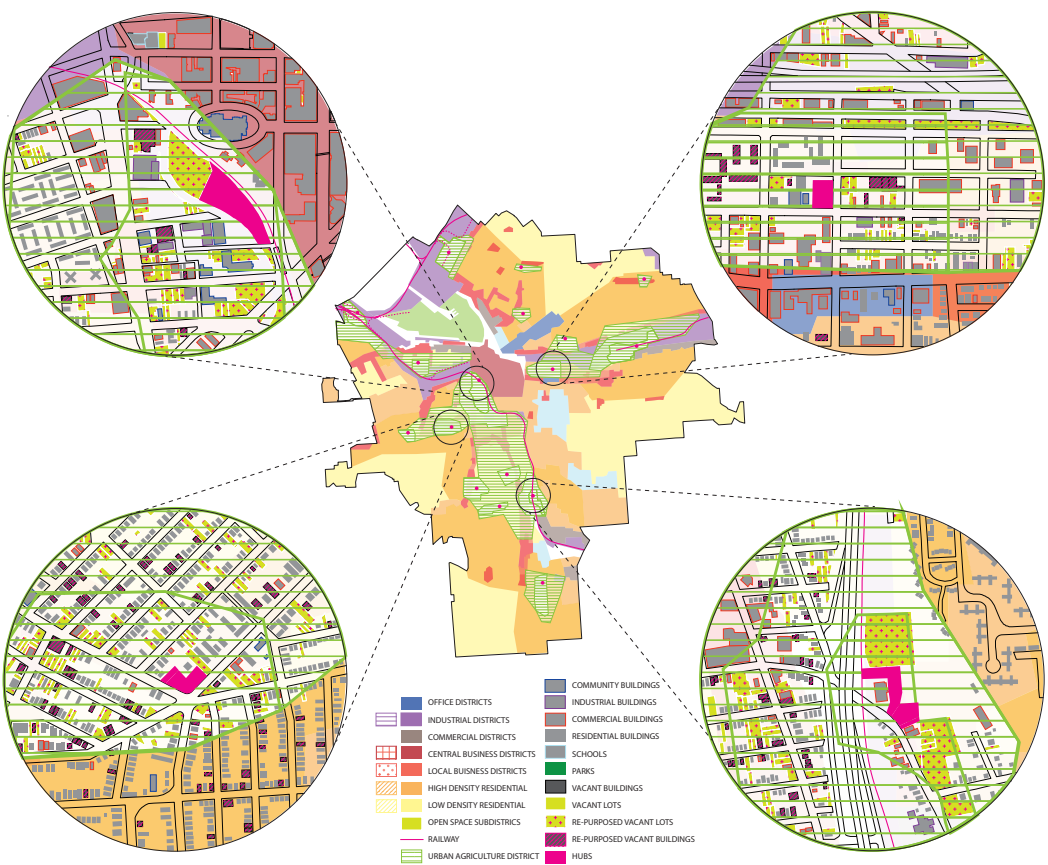
YEARS 5-10:  
urban agriculture districts  
expand around hubs



YEARS 10-20: urban agriculture districts expand and connect hubs

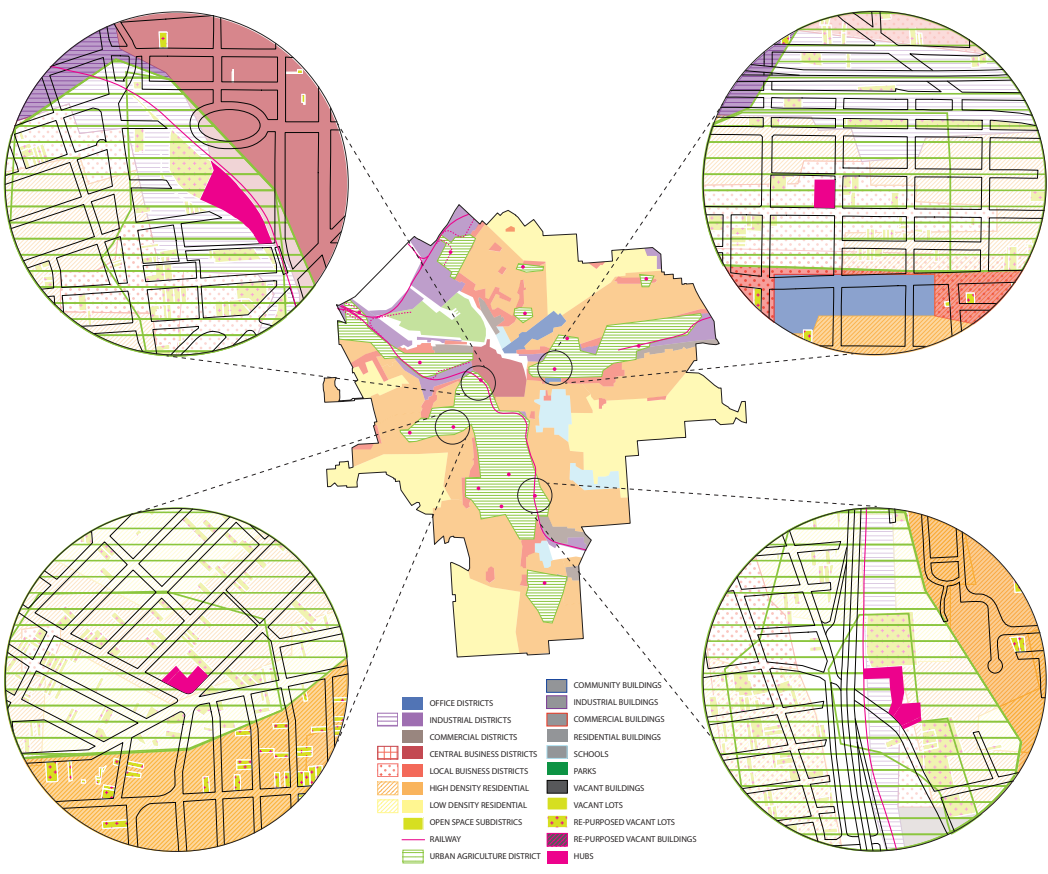


YEARS 10-20: zoning districts around urban agriculture zones are affected

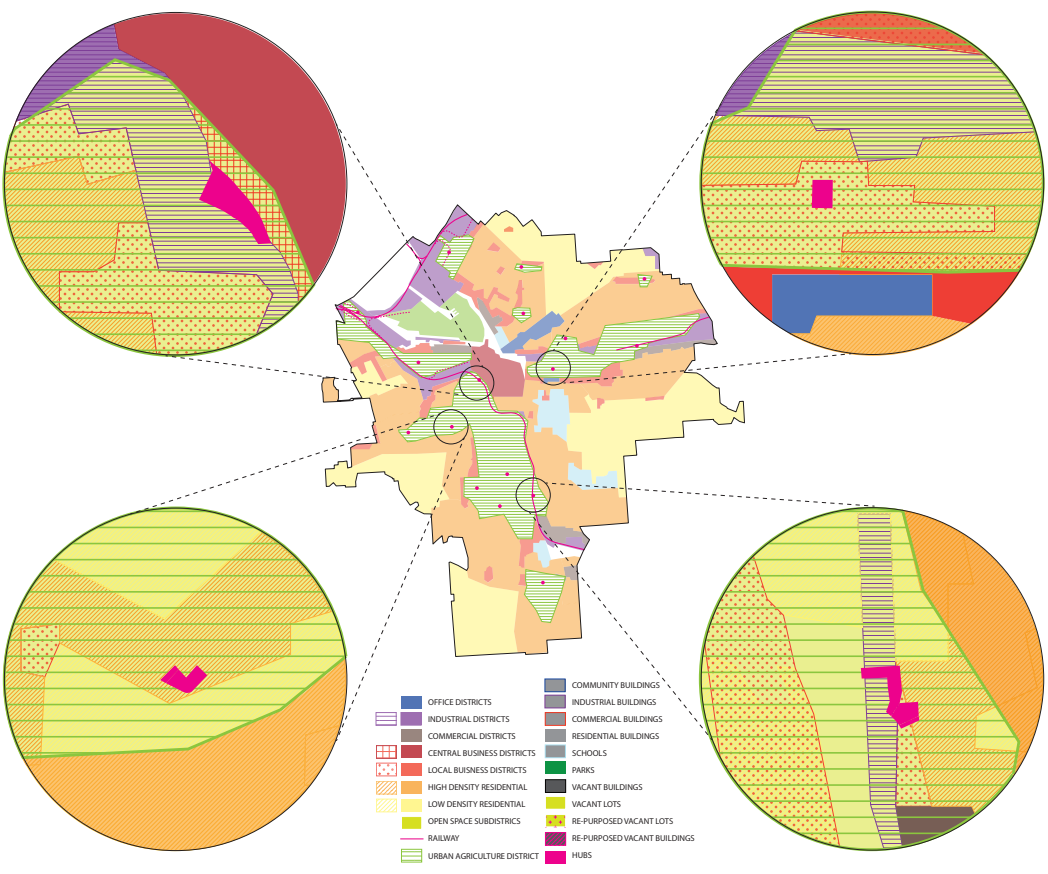




YEARS 10-20:  
urban agriculture districts  
absorbs former districts and  
becomes multi functional



YEARS 10-20:  
new hybrid of zoning districts





# site

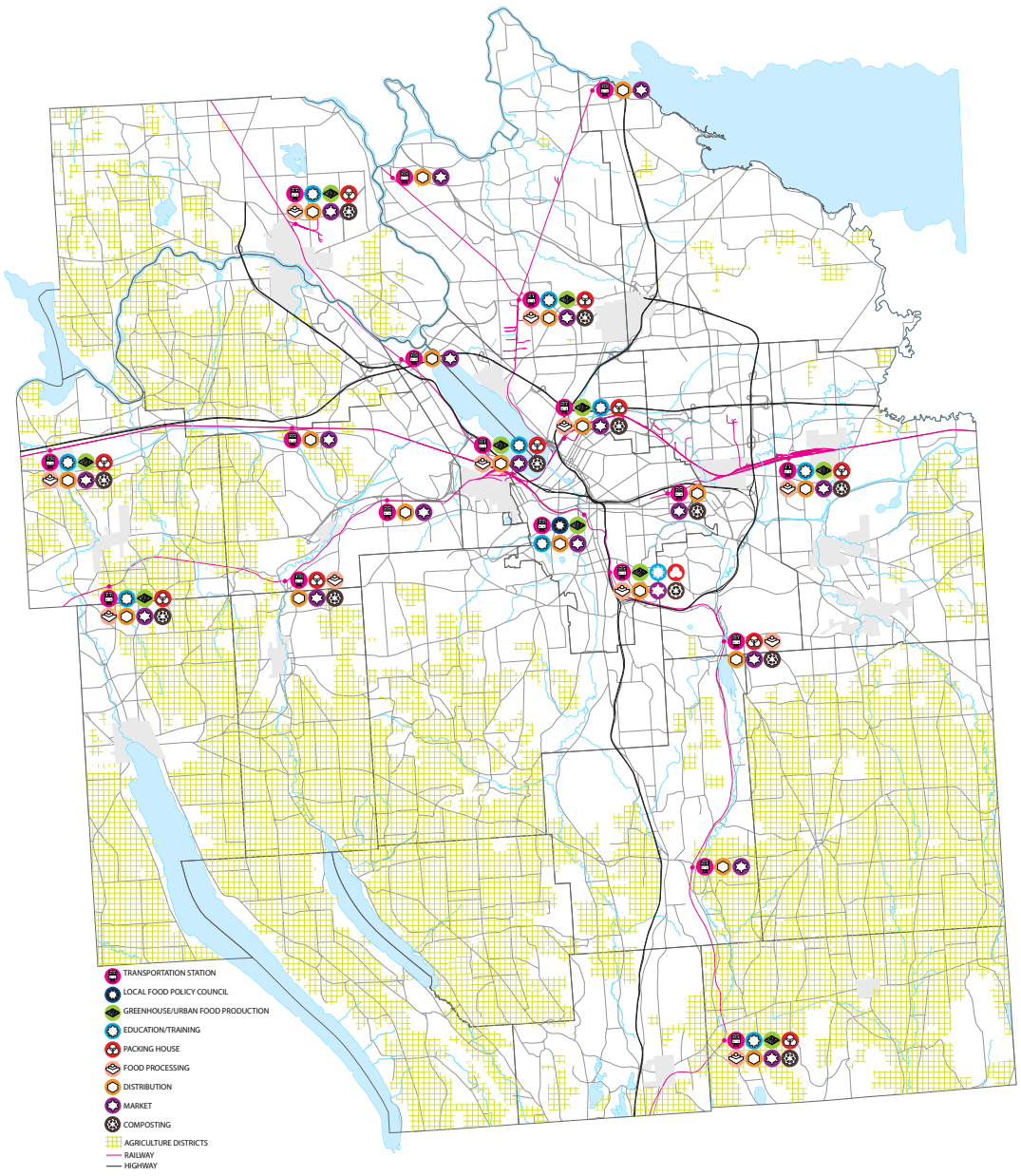
The creation of the Food Hubs along the infrastructure of the railway becomes a series of specifically located and targeted architectural interventions within the system. Through the creation of a “kit of parts” each hub is designed to provide different functions based on its location within the overall network.

5 different typologies of Hubs emerge:

1. the central hub
2. the rural hub
3. the city edge hub
4. the neighborhood hub
5. the interstitial hub

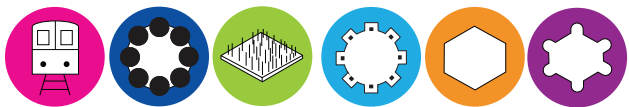
YEAR 0:

Food hub locations



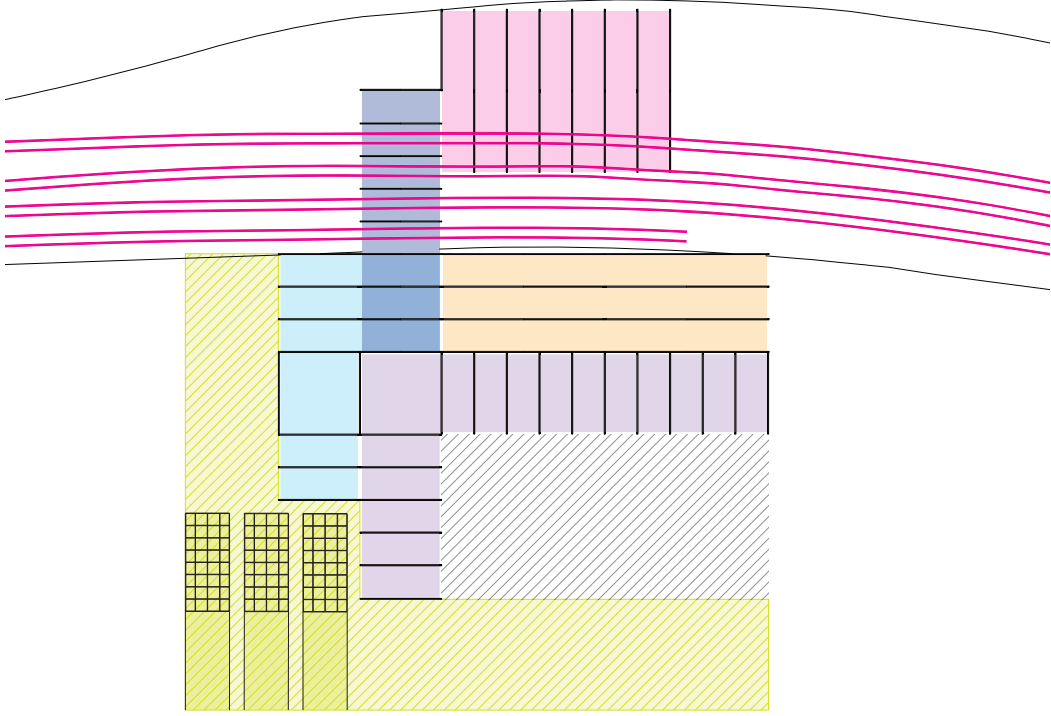
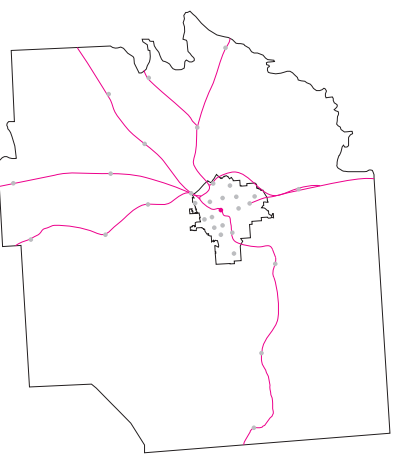
YEAR 1:

Type 1- the central downtown hub



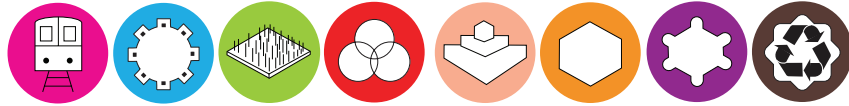
location: in the central business district; adjacent to armory square and the rescue mission campus

function: transportation station, seat for the local food policy council, headquarters of the educational program to train urban farmers, distribute to local restaurants and businesses, public market for sale of local food from region and urban farms, educational growing beds/greenhouse and composting.



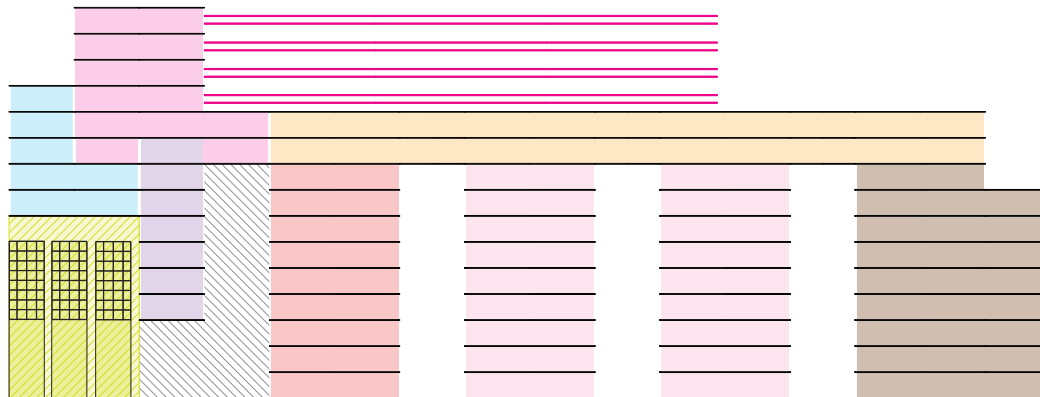
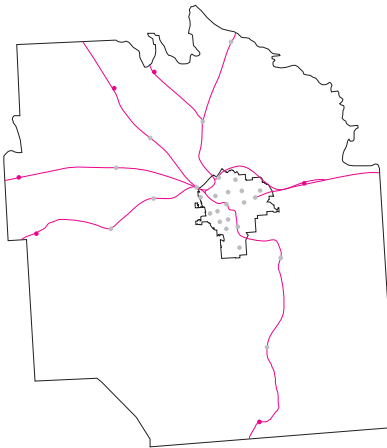
## YEAR 1-3:

## Type 2: rural hub



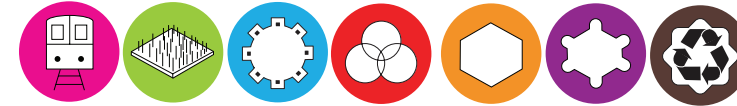
location: rural agricultural zones of Onondaga County, Adjacent to the railway and in close proximity to small towns

function: primary function is to serve as the first stop in the distribution system, aggregate goods from local farms, light food processing, sorting of goods, packaging and labeling of goods, distribution to city via railway, transportation station connect urban workers with rural farms, educational training on sustainable farming practices, small market for locals, composting site.



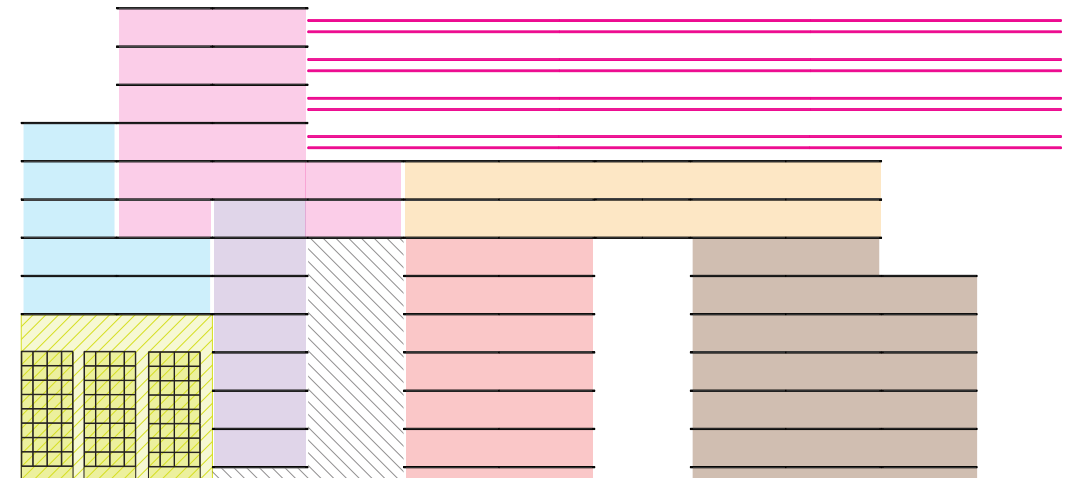
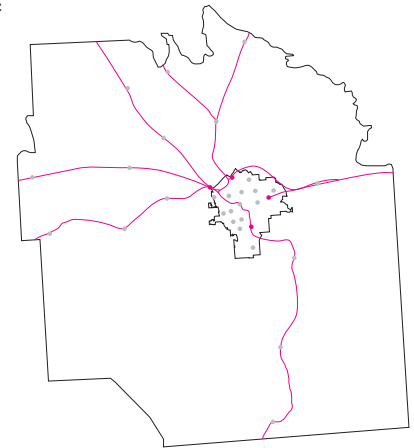
## YEAR 3-5:

## Type 3: city-edge hub



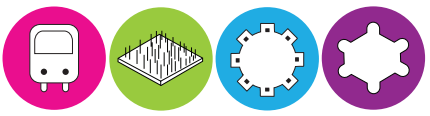
location: at critical railway junctions at the edge of the city boundary

function: major distribution points to markets, restaurants, businesses, institutions, schools in the city; aggregate goods from multiple rural hubs; food processing; packaging and labeling of goods; transportation station; educational training and greenhouses; market; composting for use on urban farms/community gardens.



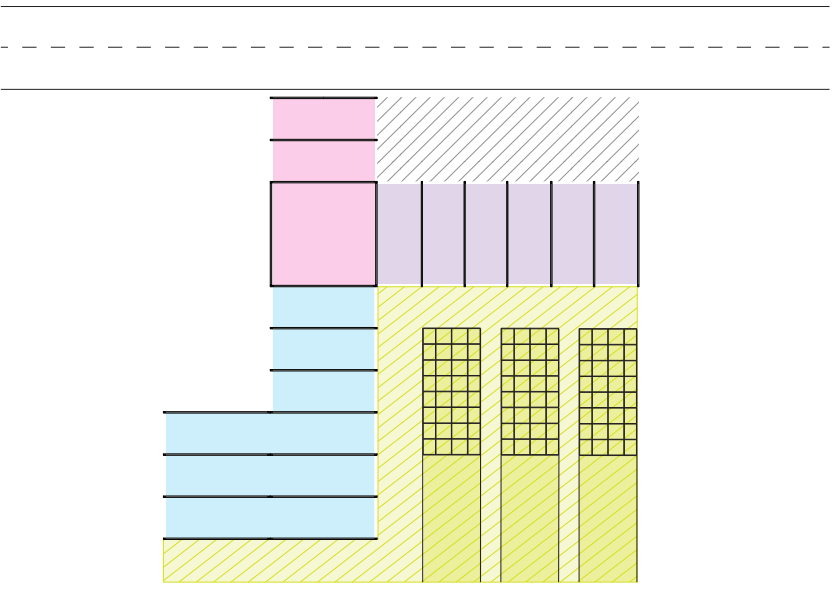
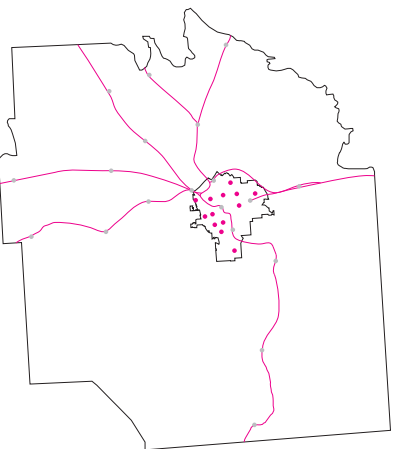
YEAR 5-10:

Type 4: neighborhood hub



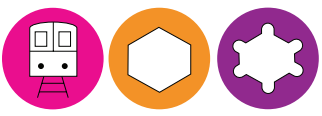
location: along city bus routes these are non-railway hubs that are located within residential neighborhoods in the city of Syracuse in the new “urban food districts.” Connections to railway hubs occur through new “food route” bus routes.

function: providing access to local food through markets as well as place to educate the community on urban farming techniques and healthy food habits



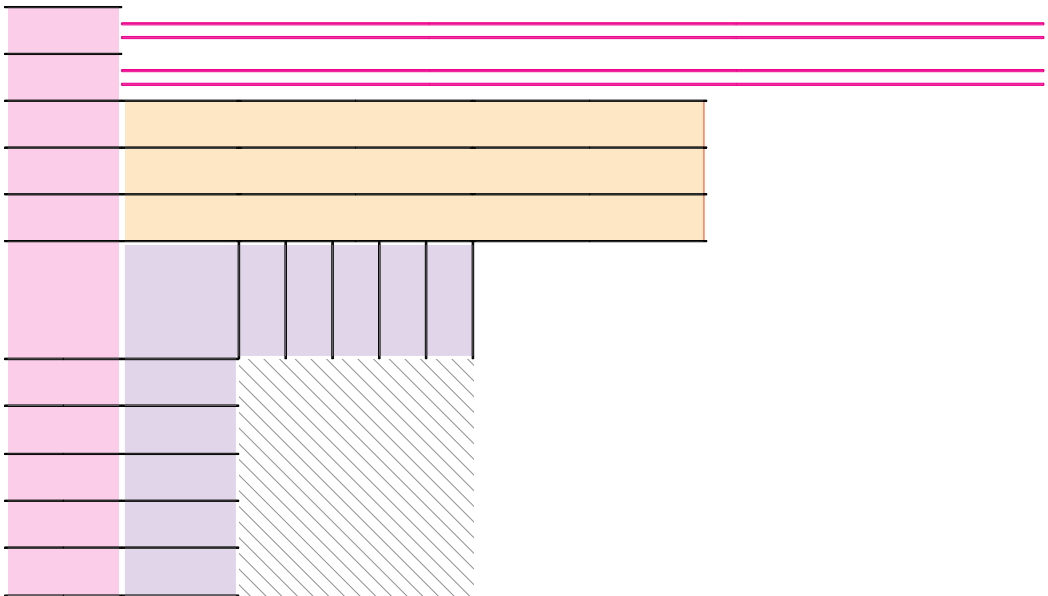
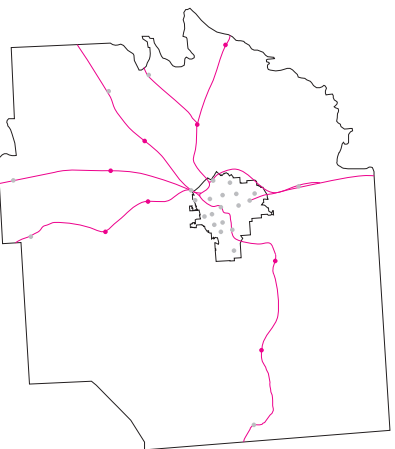
YEAR 10-20:

Type 4: interstitial hub



location: along the railways between peri-urban hubs and agri-zone hubs, adjacent to rural towns/development

function: primarily a transportation hub connecting rural towns to city, also a distribution point for local businesses, and a market for local town, begin to form as the railway becomes redeveloped.



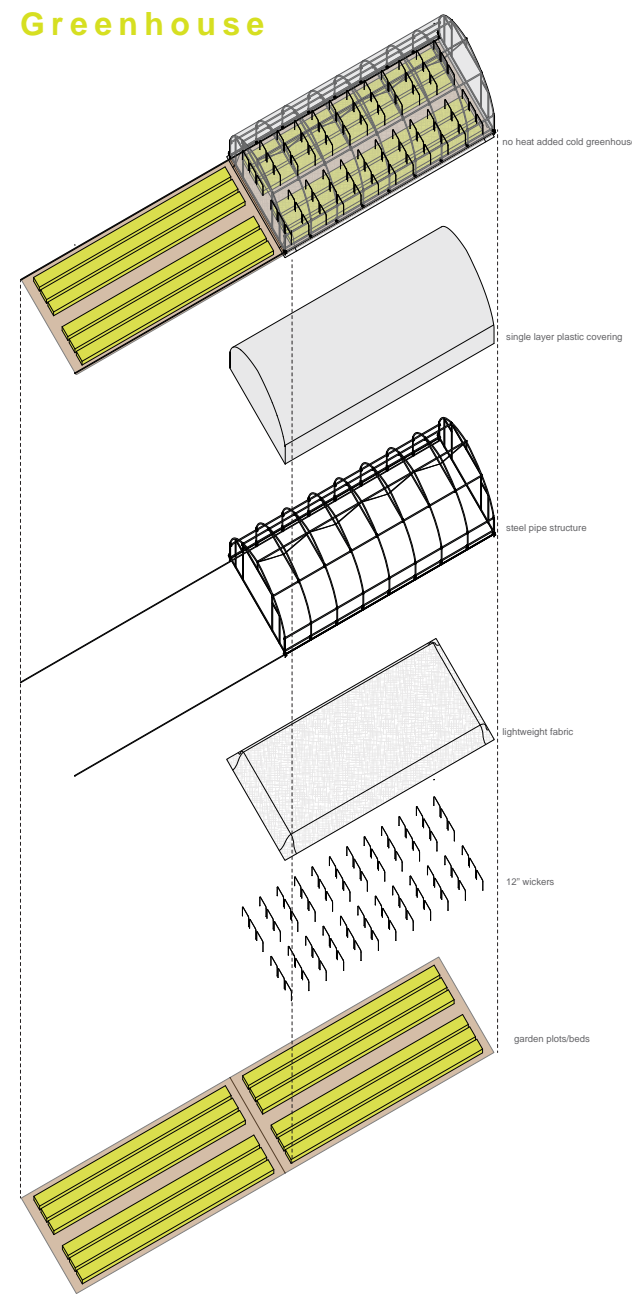


## kit of parts

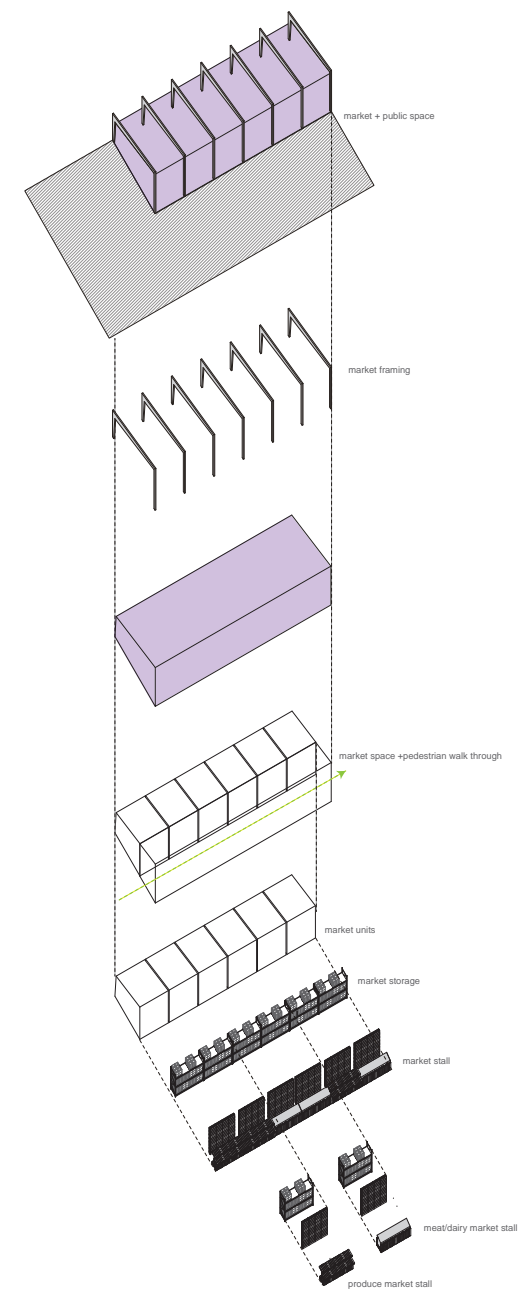
A kit of parts is established to understand the different components of the hubs and create a catalogue of parts which can make up the different hubs based on their location and scale within the whole system. Each piece of program has its own requirements and systems involved.



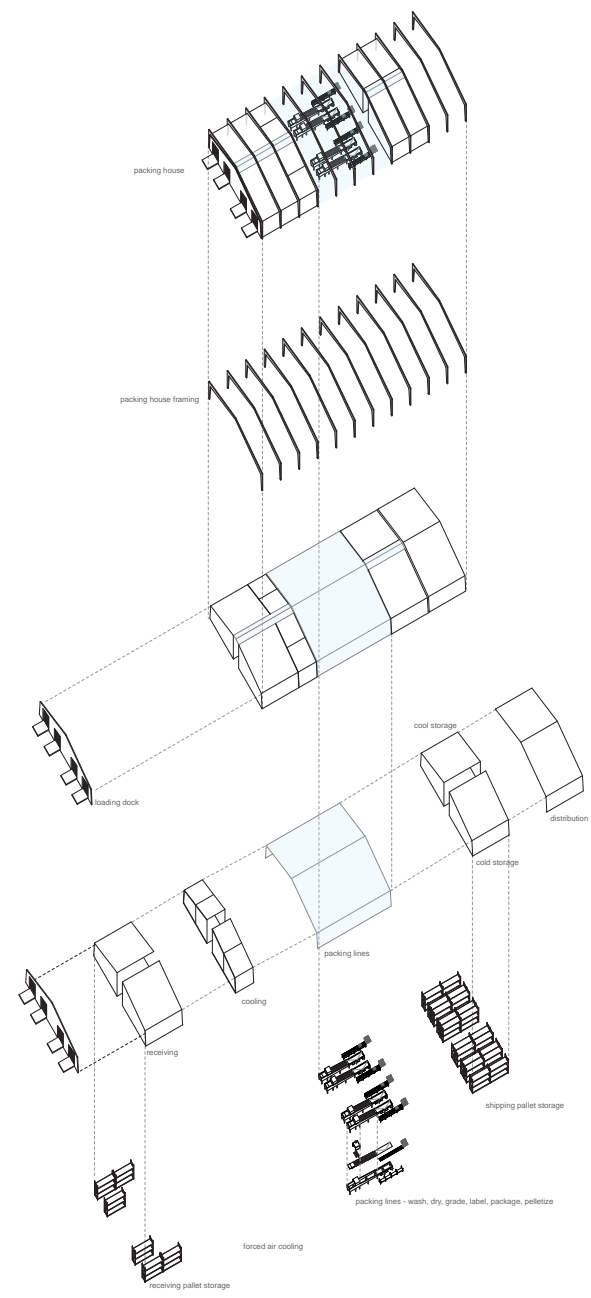
Food Production: Greenhouse



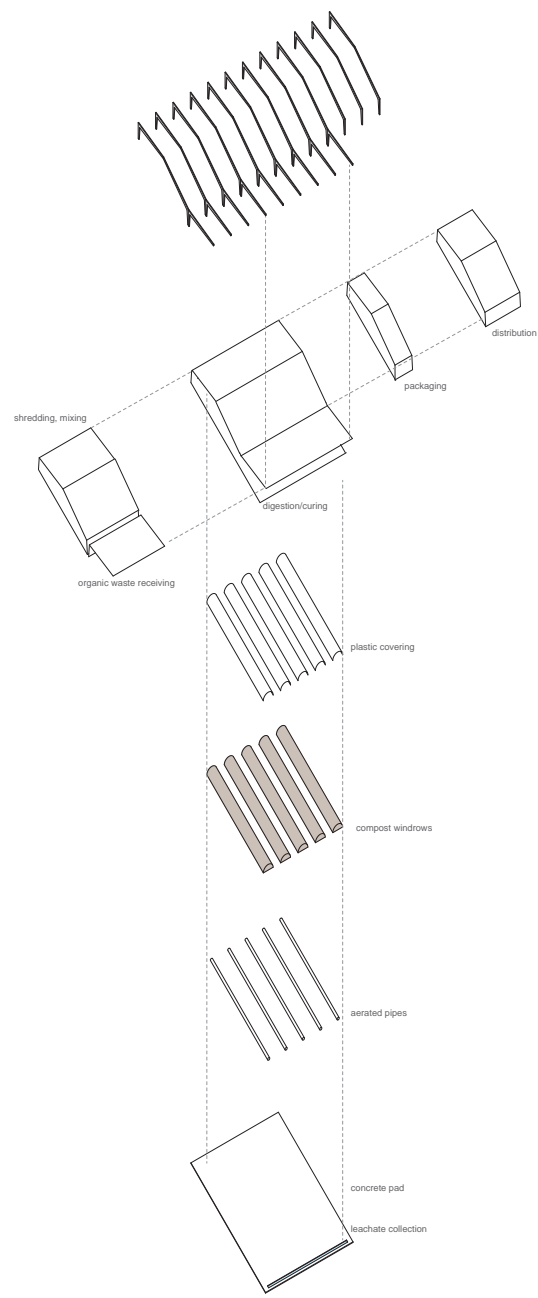
Market

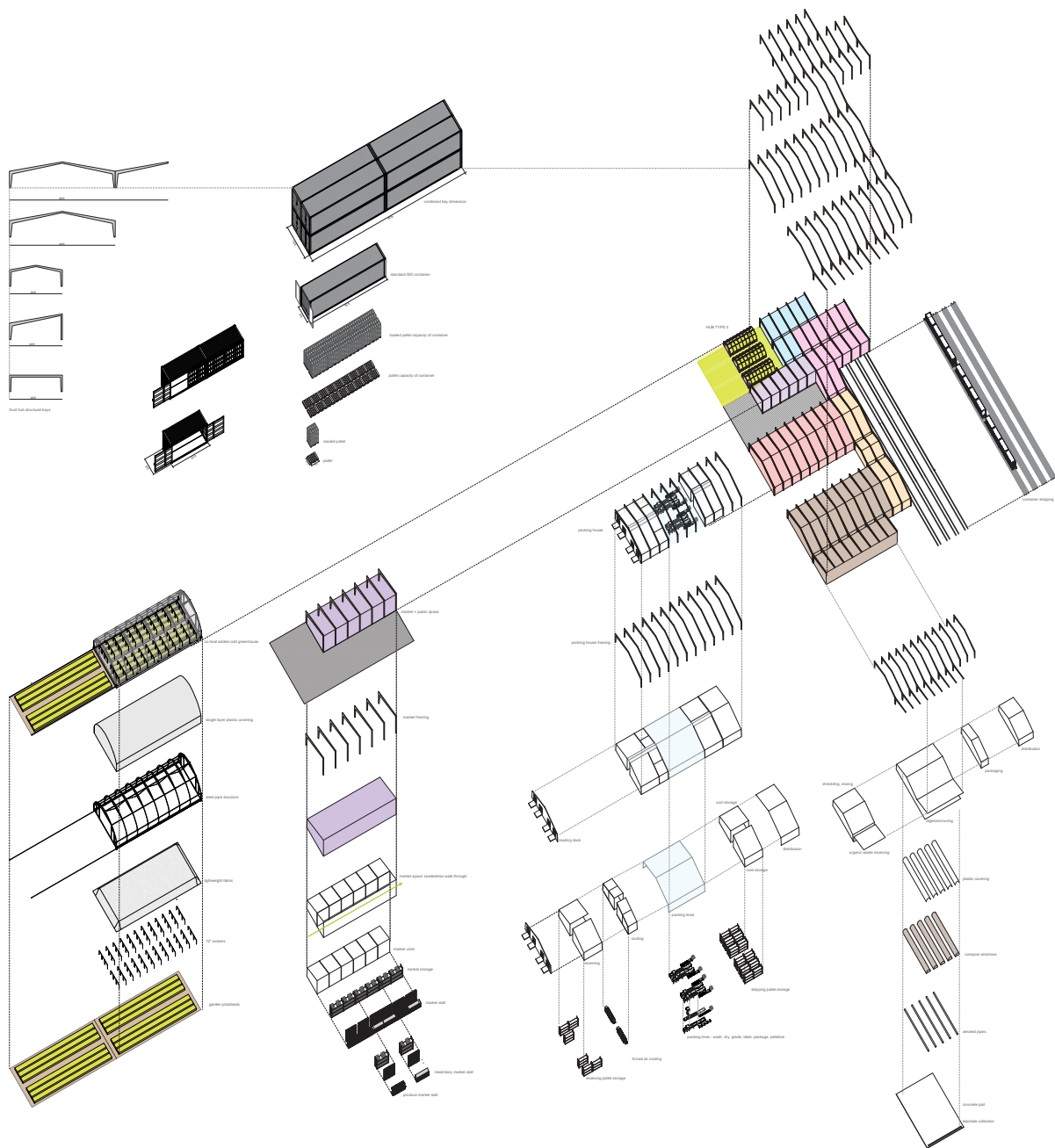


Packing House



Composting







# appendix

## PERMITTED USES:

*Farmers Market:* an outdoor or indoor market open to the public, operated by a governmental agency, nonprofit corporation, or one or more Producers, at which at least 75 percent of the products sold are local farm products or value added farm products

- Farmers Markets are a permitted use in the following zoning districts: all.

*Community Garden:* an area of land managed and maintained by a group of individuals and used for the cultivation of fruits, vegetables, plants, flowers, or herbs.

- The land shall be serve by a water supply sufficient to support the cultivation practices used on the site and land may include available public land.
- All land must be tested to determine type and level of contamination of the soil to determine what planning methods must be executed.
- Greenhouses, hoophouses, or coldframes are permitted for use on community garden land.
- Community Gardens are a permitted use in the following zoning districts: all.

*Urban Farm :* an area of land within the city limits managed and maintained by the city or an non-profit organization, or a group of producers and used for the cultivation of fruits, vegetables, plants, flowers, or herbs for sale or distribution to local institutions.

1. The land shall be served by a water supply sufficient to support the cultivation practices used on the site and land may include available public land.
2. All land must be tested to determine type and level of contamination of the soil to determine what planning methods must be executed.
3. Greenhouses, hoophouses, or coldframes are permitted for use on Urban Farm land.
4. Educational facilities: classrooms, kitchens may also be located on Urban Farm land.

5. Farm Animals and their required caging or fencing may be kept on Urban Farm land with the following restrictions:
  - Chickens, Ducks, Rabbits and similar animals are limited to one animal for each 400 square feet of land (800 square feet for residential districts)
  - Goats, Pigs, Sheep, and similar animals are limited to two animals per 14,000 square feet of land (24,000 square feet for residential districts)
  - Keeping of Bees are limited to one beehive for each 1,000 square feet of land (2,400 square feet in residential districts)
6. Urban Farms are a permitted use in the following zoning districts: all.

*Packing House:* a building used to facilitate the processing, aggregation, and distribution of local produce to serve the local community, markets, and institutions.

1. Buildings shall be required to maintain visibility to the public through windows or public space.
2. All land must be tested to determine type and level of contamination of the soil to determine what planning methods must be executed.
3. Packing Houses are a permitted use in the following zoning districts: industrial districts, local business districts, and urban agriculture districts.

*Composting Center:* land and building facilities used to facilitate the collection, processing, composting, curing and packaging of food waste, yard waste, and spoiled papers collected from city residents and businesses and institutions.

1. Material to be composted must be held indoors or under shelter so as not to be exposed to the neighboring lots.
2. Windrows may be located indoors or outdoors but must be kept 40 feet from any adjoining properties.
3. Composting Centers are a permitted use in the following zoning districts: industrial districts and urban agriculture districts.

*Farming Training Facility:* land and building facilities used to teach and train local residents on urban farming techniques and processes, greenhouse construction, eating habits, and cooking.

1. Usually located in conjunction with a community garden, urban farm, or school.
2. Farming Training Facilities are a permitted use in the following zoning districts: all.

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# STIMULATING OUR FOOD ENVIRONMENT

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